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## DEATHS AMONG TAXPAYERS AND NON-TAXPAYERS INCOME TAX, PROVIDENCE, 1865


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NUMEROUS observations have shown that the death rate among the well-to-do is generally lower than among the poor. It has always seemed that a careful study of the details of this difference might throw considerable light on public health problems. I have long wished to make such an investigation in Providence, where I have been familiar with living conditions for many years. When the present income tax was levied I hoped that data for such a study might become available, but, unfortunately, they are not. My son suggested that the necessary material is at hand for the year 1865, for which the census and the income tax list are both available. The use of this material has involved a great deal of labor.

The names of the income taxpayers, something over 2,000, were compared with the census returns and a card was made for each family, showing age, sex, and occupation for each person. About 200 of the taxpayers could not be found in the census. There was no record of the death of any of these. They were probably, for the most part, single men who had moved away. They are not included among the taxpayers, and any tendency which their omission might have would be to increase the apparent death rate in this group.

The taxpayers and their families were tabulated by age groups and these groups subtracted from the age groups of the whole population give the data which, sufficiently accurately, represent the non-taxpaying element of the population.

The original death returns were compared with the census names and the deaths distributed into taxpayers and non-taxpayers. The deaths were then tabulated from the original returns, according to the present revision of the international classification. I began the study of medicine under a preceptor in Providence in 1876, and was acquainted with many of the older practitioners, and became familiar with their viewpoint, so that this tabulation is probably fairly accurate within the limits of the medical knowledge of the time.

Table I shows the distribution of the population and of the deaths by ages, as above described, and also the death rates in the two classes of the population.

There were in the whole city in 1865, 1,211 deaths from all causes. Of these 114 were among 10,515 taxpayers, giving a gross annual death rate of 10.8 per 1,000 living. There were 1,097 deatths among

TABLE I.

POPULATION OF PROVIDENCE, TAXPAYERS AND NON TAXPAYERS AND DEATH RATES BY AGES.

| Ages | Total Population | Taxpayers | Population Less Taxpayers | Deaths Taxpayers | Death Rate Taxpayers per 1000 | Deaths Non Taxpayers | Death Rate Non Taxpayers per 1000 |
|---|---|---|---|---|---|---|---|
| Under 1 | 1151 | 182 | 969 | 17 | 93.4 | 184 | 189.8 |
| 1 to 4 | 4159 | 768 | 3391 | 31 | 40.3 | 226 | 66.6 |
| Under 5 | 5310 | 950 | 4360 | 48 | 50.5 | 410 | 94.0 |
| 5 to 9 | 5713 | 1002 | 4711 | 16 | 15.9 | 74 | 15.7 |
| 10 to 19 | 10631 | 1944 | 8687 | 6 | 3.0 | 72 | 8.2 |
| 20 to 29 | 10754 | 1824 | 8930 | 11 | 6.0 | 106 | 11.8 |
| 30 to 39 | 8750 | 1743 | 7007 | 8 | 4.5 | 109 | 15.5 |
| 40 to 49 | 6318 | 1423 | 4895 | 2 | .1 | 71 | 14.5 |
| 50 to 59 | 3944 | 922 | 3022 | 8 | 8.6 | 76 | 25.1 |
| 60 to 69 | 2109 | 464 | 1645 | 7 | 15.1 | 65 | 39.5 |
| 70 & over | 1066 | 243 | 823 | 8 | 32.9 | 114 | 138.5 |
| Totals | 54595 | 10515 | 44080 | 114 | 10.8 | 1097 | 24.8 |

nontaxpayers, giving a gross annual death rate of 24.8 per 1,000 living, considerably more than double that of the taxpayers.

From this it is seen that at every age period, except 5-9, the death rate among the nontaxpayers was much higher, in most instances several times higher, than among the taxpayers. At ages 5-9 the rate among the taxpayers was very slightly higher. When the death rates by ages of the nontaxpayers are applied to the taxpayers, the deaths thus calculated are 265.7, which yields a death rate of 25.2, which is very slightly higher than the actual death rate of the nontaxpayers, showing that the age distribution of the two classes, though favorable to the taxpayers, is so in only a very slight degree. The difference, then, in the ages of the population does not explain the very striking differences in the mortality rates.

Infant mortality is always of great interest to sanitarians, and is usually based on the number of births during the year. It is impossible to calculate this for Providence for 1865, for it was not practicable to distribute the births according to the taxpaying status of the families in which they occurred. In this instance it is probably fairly satisfactory to base the infant mortality rate on the number of children under one year of age. The number of infants under one year of age, according to the census of 1865, was 1,151. The number of living births recorded was 1,298, which indicates that the census was more complete than are many censuses for this age. The birth rate in 1865 was unusually low, owing, without doubt, to the influence of the Civil War.

Of the 1,151 infants enumerated by the census of 1865, 182 were in the families of taxpayers, and of the 201 deaths of infants 17 were in taxpayers' families. This yields an infant death rate of 93.4. There were 969 infants in families of nontaxpayers, with 184 deaths, yielding an infant death rate of 189.8. These rates are probably sufficiently accurate for comparing the two classes of the population under consideration, for there is no reason to think that there was much difference in the completeness of the census enumeration in the two classes. As an indication of the actual infant mortality the figures are, of course, of little moment.

The chief purpose of this study is to determine what differences there may be in the incidence of the different causes of death on the taxpayers and the nontaxpayers. This is shown in Table II. The deaths according to the principal causes, or groups of causes, in the two population classes, are given, and also the mortality rates per 100,000 living. The rates among the taxpayers are then adjusted to the age distribution of the nontaxpayers. Although in several instances this adjustment made a very appreciable difference in the rates, in no instance did it reverse the relative standing of the two population classes.

TABLE II.

DEATH RATES BY CAUSES AMONG TAXPAYERS AND NON TAXPAYERS

| Cause of Death | Deaths | | Rate per 100,000 Living | | |
|---|---|---|---|---|---|
| | Taxpayers | Non Taxpayers | Taxpayers | Taxpayers Adjusted | Non Taxpayers |
| Typhoid fever | 10 | 76 | 95.1 | 95.1 | 172.4 |
| Acute contagious diseases | 32 | 174 | 304.3 | 334.7 | 394.7 |
| Pulmonary tuberculosis | 15 | 190 | 142.6 | 139.7 | 431.0 |
| Other forms of tuberculosis | 4 | 20 | 38.0 | 36.7 | 45.3 |
| Cancer | 2 | 14 | 19.0 | 15.3 | 31.7 |
| Other general diseases | 3 | 8 | 28.5 | 28.8 | 18.1 |
| Diseases of nervous system | 3 | 34 | 28.5 | 31.4 | 77.1 |
| Diseases of nervous system(over 20) | 8 | 53 | 76.0 | 65.3 | 120.2 |
| Convulsions (under 5)[1] | 1 | 18 | 1.0 | | 4.1 |
| Heart disease | 2 | 42 | 19.0 | 16.5 | 95.2 |
| Diseases of respiratory system | 3 | 86 | 28.5 | 36.1 | 195.1 |
| Diseases of digestive system (over 20) | 2 | 16 | 19.0 | 16.3 | 36.2 |
| Diarrheal diseases | 15 | 153 | 142.6 | 146.9 | 347.1 |
| Genito-urinary diseases | 2 | 9 | 19.0 | 18.7 | 20.4 |
| Puerperal diseases | 3 | 12 | 28.5 | 29.6 | 27.2 |
| Diseases of infancy[2] | 3 | 42 | 16.5 | | 43.3 |
| Old age | 2 | 40 | 19.0 | 18.0 | 90.7 |
| External causes | 1 | 40 | 9.5 | 8.8 | 90.7 |
| Unknown causes | 3 | 45 | 28.5 | 27.4 | 102.0 |
| Other diseases[3] | | 25 | | | 56.7 |
| Totals | 114 | 1097 | | | |

1 Rates per 1000 living under 5 years.
2 Rates per 1000 infants enumerated in Census.
3 Includes erysipelas, 7; syphilis, 2; gonorrhea, 1; diseases of female organs, 3; abscesses, 3; tetanus, 1; other diseases of digestive organs (under 20), 8.

The adjusted death rate was higher among the nontaxpayers in every group of diseases except two, certain general diseases represented by few deaths, and the puerperal diseases. The difference in favor of the nontaxpayers in puerperal diseases is considerably greater than here appears, for these rates are calculated on the general population. It would be much more decisive to calculate them on the number of confinements, but this is not feasible. It is probably fairly indicative to use the children under one year of age as a base, and according to this method the death rate for the puerperal diseases is 16.4 per 1,000 children among the taxpayers and 12.2 among the nontaxpayers.

With the exception of the two causes just mentioned, the death rate is higher, and, in most instances, decisively higher, among the nontaxpayers. There are 25 deaths among nontaxpayers which represent causes which do not appear among the taxpayers at all. Most of the principal causes show a very much higher incidence among the nontaxpayers. Thus deaths from external causes are ten times as numerous, from respiratory diseases over five times, from heart disease six times, from pulmonary tuberculosis four times, from convulsions under five years, four times as numerous among the nontaxpayers. All of the 5 deaths from suicide and all but 1 of the 35 deaths from accidents were among the nontaxpayers.

It is perhaps surprising to note how little difference there is in the incidence of the acute contagious diseases in the two classes. However, in 1865 the then health officer did not believe that either scarlet fever or diphtheria were contagious, and no one took much precaution to prevent the spread of any infectious disease, except smallpox. All of the 11 deaths from smallpox were of nontaxpayers. In fact, the well-to-do were generally much better protected by vaccination, but probably this is not true now. Towards the close of the nineteenth century Bertillon, in Paris, found these diseases decidedly less prevalent among the rich than among the poor, and Guilfoy, in New York, has still more recent but unpublished figures showing the same phenomenon.

The opportunities for fecal contamina-

tion were in 1865 enormously greater among the poor, and there was no municipal water supply. This may possibly be a partial explanation of the greater prevalence of typhoid fever and diarrheal diseases among the nontaxpayers.

Pulmonary tuberculosis has always been a disease of poverty. One would expect that the same difference between the taxpayers and nontaxpayers would be noted in other types of tuberculosis as in the pulmonary form, but it is not so marked. Perhaps it is because the figures are small, but it may be in part due to less accurate diagnosis among the less wealthy. The recognition of other types is not so easy as is the pulmonary, and while the physicians practicing in the higher economic stratum were exceedingly well qualified, there were no hospitals where the masses could receive the careful attention that they do now.

The excess of cancer among the well-to-do is, in part, to be explained in the same way.

The figures for "other general diseases" also are small, but it is probably significant that the deaths from alcoholism were all among the nontaxpayers. The one case of diabetes was that of a taxpayer.

Of the 34 deaths from diseases of the nervous system, under twenty years, among the nontaxpayers, it is probable that the large majority were due to some form of meningitis or encephalitis. This is inferred from the wording of the certificates, from the ages of the decedents, and from personal knowledge of the terms used by the physicians. It is probable, too, that many of these deaths were in reality tuberculous meningitis and would go to swell the number of tuberculosis deaths credited to the nontaxpayers which we found was lower than was expected.

The death rate for diseases of the nervous system, over twenty years of age, is nearly twice as great among the nontaxpayers, and this difference is due chiefly to cerebral hemorrhage and paralysis.

There is little to say about the diseases of the digestive organs in persons over twenty years of age. Deaths from these are twice as numerous among the nontaxpayers, and include such causes as diseases of the stomach and of the liver and peritonitis. This group of diseases under twenty years of age has no fatalities among the taxpayers, though there were eight among the nontaxpayers, including two deaths from thrush, one from gastric fever (under two years), one from hepatitis, one from obstruction of the bowel (two years), and three from peritonitis.

There is very little difference between the two groups in the small number of deaths from genito-urinary diseases.

As was to be expected, deaths from "diseases of infancy" are nearly three times as numerous among the nontaxpayers.

The mortality attributed to old age is more than four times as great among the nontaxpayers as among the taxpayers.

This last group might, perhaps, be properly combined with the deaths reported as due to unknown causes. In this case the rates would be 192.7 and 47 respectively, the nontaxpayers' rate being almost exactly four times as great as the taxpayers. It seems not at all unlikely that less competent and less careful medical service, and hence less accurate diagnosis, among the nontaxpayers, is the principal cause of this difference, but whatever the cause of the difference, and whatever the cause of the deaths, the fact remains there are more deaths among the nontaxpayers than among the taxpayers.

Another point of interest is the relative prevalence of the so-called degenerative diseases of advancing years. We are often told that these result from high living, eating too much protein, the nervous strain of modern business, "going the pace," etc. If this is true these diseases should be much more common among the rich than among the poor. However it may be now, it was not so in

1865. For the purpose of showing this, deaths from genito-urinary diseases above sixty years, deaths from cerebral hemorrhage and paralysis, deaths from heart disease, from old age, and from unknown causes over fifty years, have been added together. The rate for these among the taxpayers is 104.6 and among the nontaxpayers 294.9, or nearly three times as great. As the age distribution of the taxpayers is more unfavorable, the adjusted rate would show a still greater difference.

Of the deaths among the taxpayers, 93 were of persons whose fathers were born in the United States. In the families of taxpayers 9,352 had fathers born in the United States. This gives a death rate of almost 9.94, just a little under that of the taxpayers as a whole. In the nontaxpayers' families were 21,350 persons whose parents were born in the United States. Of these 538 died, giving a death rate of 25.2. Thus economic status appears to have practically the same influence on persons of American parentage as upon the population as a whole. If the death rates of the taxpayers by ages are applied to the American taxpayers and to the American nontaxpayers, and the rates determined for these calculated deaths, they are found to be 10.56 and 10.07 respectively, showing that what little difference in age distribution there is, is favorable to the nontaxpayers.

It thus appears that in a city of over 50,000 in 1865 the death rate in the families of income taxpayers was less than one-half what it was among the nontaxpayers. This was not due to difference in age distribution nor to parent nativity. Though the figures for different causes are too small to warrant definite conclusions, or to permit further detailed study, they are certainly suggestive and warrant further investigation along these lines. However, one uncertainty common to such studies is minimized. An income tax seems to be a far better means of segregating persons of good economic status than do geographical distribution, number of servants, or number of rooms in the house. When we have definitely determined the incidence of different causes of death on the two classes, we will be prepared for what should be of great value, namely, a study of the habits of life and of the environment which make for the longevity of the well-to-do.

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# DEATHS AND DISABILITIES FROM HEART DISEASE

## A PUBLIC HEALTH PROBLEM

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HEART disease has become the leader of the causes of death. Not many years ago tuberculosis held that conspicuous position and had held it for time out of mind. Due to many causes, the chief of which undoubtedly is the general and intensive campaign against it, tuberculosis has been driven back, so that since the year 1918, in Syracuse, it held sixth position. Our attention has been focused so long on the fight against tuberculosis that this result is hardly comprehended, but the throwing into prominence of heart disease as the leading cause of death has caught the attention and stimulated the imagination of the profession.

The organized effort to prevent and to cure tuberculosis is easy of analysis. The tuberculosis campaign did not begin until it had been demonstrated that the specific cause of every form of tuberculosis was a particular bacillus. The cause of heart disease is not so simple. Instead of a single bacillus as a causative agent, we are met with the entire host of pathogenic bacteria, including the tubercle bacillus.

In the beginning of the tuberculosis campaign effort was directed to finding a way to kill the bacilli in the tissues and so to save the patient. It was a failure, and all such efforts, though theoretically ideal, and though still industriously pursued, have not yet been crowned with success. Inability to destroy the bacilli within the body directed research to other factors in the problem: to the general condition of those infected, to a study of their previous diseases, to their heredity, to their development, to their nourishment, to their housing, to the conditions under which they worked, and so on, and the conclusion was finally reached that to combat tuberculosis successfully it was necessary to abandon exclusive methods, to turn a deaf ear to special propagandists, and, as Emerson has so well expressed it, "aim at a stable progress of endeavor which accepts and includes the facts that disease control depends on a general elevation of the health of all the people, and that no age, no sex, no occupation or race group can long maintain an advanced state of healthfulness without the interest and assistance of all the rest."

Upon such a foundation more and more effective methods of improving the condition of the exposed have been developed, and are becoming standardized, with, as one of its results in a field of special endeavor, the gradual elimination of one of the greatest of plagues. It is this phase of the campaign against tuberculosis which gives hope of success to an organized movement against that disease that has supplanted it in importance. The tubercle bacilli are as active as ever. Their dissemination only is preventable, and the conditions which favor their development are within control. Some of the specific bacteria causing heart disease are beyond our reach, but if the practicability of applying measures to control the disease shall receive consideration, it shall make possible such gradual decrease of death and damage from heart disease as has attended the efforts to control tuberculosis.

Let us state the problem. The vital statistics for Syracuse are complete for 1923. The report shows 2,390 deaths from all causes; of these there were 402, or 16.8 per cent, from heart disease; 251, or 10.5 per cent, from lobar and bronchial pneumonia; 196, or 8.2 per cent, from all forms of cancer; 186, or 7.8 per cent, from apoplexy and cerebral hemorrhage;

TABLE I.

DEATHS IN SYRACUSE, N. Y.

| | 1922 | | | | 1923 | | | |
|---|---|---|---|---|---|---|---|---|
| | All Ages | | 40 Years and Over | | All Ages | | 40 Years and Over | |
| | Number | Per cent | Number | Per cent | Number | Per cent | Number | Per cent |
| All causes | 2289 | 100. | 1432 | 100. | 2390 | 100. | 1511 | 100. |
| Tuberculosis (all forms) | 83 | 3.6 | 28 | 1.9 | 100 | 4.2 | 34 | 2.2 |
| Cancer | 185 | 8.1 | 172 | 12. | 196 | 8.2 | 183 | 12.1 |
| Cerebral hemorrhage | 176 | 7.7 | 173 | 12.1 | 186 | 7.8 | 180 | 11.9 |
| Pneumonia (all forms) | 196 | 8.5 | 101 | 7.0 | 251 | 10.5 | 139 | 9.2 |
| Kidney disease | 165 | 7.2 | 131 | 9.1 | 157 | 6.6 | 130 | 8.6 |
| Heart disease | 429 | 18.7 | 358 | 25.0 | 402 | 16.8 | 360 | 23.8 |

TABLE II.

DEATHS IN REGISTRATION STATES U. S.

| | 1921 | | | | 1922 | | | |
|---|---|---|---|---|---|---|---|---|
| | All Ages | | 40 Years and Over | | All Ages | | 40 Years and Over | |
| | Number | Per cent | Number | Per cent | Number | Per cent | Number | Per cent |
| All causes | 1,009,673 | 100. | 598,709 | 100. | 1,047,402 | 100. | 627,525 | 100. |
| Tuberculosis (all forms) | 85,739 | 8.5 | 31,093 | 5.4 | 85,484 | 8.2 | 31,527 | 5. |
| Cancer | 75,113 | 7.4 | 69,169 | 12. | 78,355 | 7.5 | 72,346 | 11.5 |
| Cerebral hemorrhage | 70,664 | 7.0 | 68,375 | 11.8 | 74,979 | 7.2 | 72,636 | 11.6 |
| Pneumonia (all forms) | 76,770 | 7.6 | 35,808 | 6.2 | 91,032 | 8.7 | 42,812 | 6.8 |
| Kidney disease | 76,131 | 7.5 | 66,211 | 11.4 | 80,629 | 7.7 | 70,993 | 11.3 |
| Heart disease | 137,157 | 13.6 | 119,842 | 20.7 | 149,659 | 14.3 | 132,408 | 21.1 |

157, or 6.6 per cent, from all forms of kidney disease, and 100, or 4.2 per cent, from all forms of tuberculosis. In other words, there were more than four times as many deaths from heart disease as there were from tuberculosis, and fifty-one more deaths from heart disease than from all forms of tuberculosis and of all forms of pneumonia together. Mr. John Metz, the registrar of vital statistics for Syracuse, has prepared for me, besides this, tables showing deaths from the six causes of more than half the deaths of the year, and has given deaths at all ages and those at forty and over, and their percentages.

The statistics for the nation for 1923 are not yet completely assembled. Those of 1922 are just in the press. Davis has kindly compiled from proof sheets the following table of deaths for 1920, 1921, and 1922, for all ages and for the age of forty and over, and has given their percentages.

I need not dwell on this table, for it is essentially similar to that for Syracuse, except that in the Syracuse statistics tuberculosis is and has been constantly sixth, at all ages and at forty and over, since 1918. In the United States registration states tuberculosis stood second as a cause of death at all ages in 1921 and third in 1922.

Eichel has compiled a table of the deaths from the six commonest causes in New York State, in New York City, and in the rest of the state, and has made a table of deaths at all ages and at forty years and over for 1922 and 1923. Heart disease caused 20.3 per cent of all deaths in the state in 1923. In 1922 and 1923 tuberculosis ranked fifth as a cause of death at all ages.

The percentages of deaths from heart disease of males and females in 1922 in the United States were 51.6 and 48.4 per cent.

From these figures it is shown that

TABLE III

DEATHS IN NEW YORK STATE

| | 1922 | | | | 1923 | |
|---|---|---|---|---|---|---|
| | All Ages | | 40 Years and Over | | All Ages | |
| | Number | Per cent | Number | Per cent | Number | Per cent |
| All causes | 139,038 | 100. | 87,403 | 100. | 141,048 | 100. |
| Tuberculosis (all forms) | 10,695 | 7.7 | 3,890 | 4.5 | 10,525 | 7.5 |
| Cancer | 11,697 | 8.4 | 10,825 | 12.4 | 12,184 | 8.6 |
| Cerebral hemorrhage | 9,420 | 6.8 | 9,205 | 10.5 | 7,169 | 5.1 |
| Pneumonia (all forms) | 13,393 | 9.6 | 6,132 | 7.0 | 14,100 | 9.9 |
| Kidney disease | 11,867 | 8.5 | 10,557 | 12.1 | 10,045 | 7.1 |
| Heart disease | 25,259 | 18.2 | 22,414 | 25.6 | 28,696 | 20.3 |

heart disease is the most fatal of all diseases, that it is no respector of sex, and that its fatality increases with increasing years.

It is difficult to say definitely what the relation is between the number of deaths from heart disease and the number of those living but disabled by it. Accurate statistics are not available, for the morbidity of heart disease is not reported. From the study of cases recorded in cardiac clinics, however, it is safe to conclude that "for one death from heart disease annually there are from five to nine cases of damaged hearts in persons living." On this basis there were in the United States in 1922 a mean number of 1,047,613 cardiac cripples, and in our own city, in 1923, 2,814.

The number of cases of disabled hearts that have escaped diagnosis or realization on the part of their owners is very large. In St. Lawrence's study of 100 families in which there were known to be one or more cases of heart disease, he found thirty-eight additional cases, twenty-seven, or 70 per cent, of whom were unconscious of their condition. It is a common experience of insurance examiners to find evidences of heart disease in applicants who assert entire ignorance of its existence.

That such a condition can remain without symptoms indefinitely is not within the experience of clinicians. A review of the studies on this aspect of the case published by various writers showed that the lapse of time between the probable invasion of the heart and the appearance of cardiac symptoms varied widely. In a study of 600 cases of rheumatic origin, the average time was 5.36 years.

The known causes of heart disease are many. Dock, discussing the causative agents of heart disease, after specifying almost every one of the known pathologic bacteria, says: "In fact, we must remember that every acute, severe disease may cause similar disease of the heart."

This is true, but the commonest association of heart disease is with rheumatism. No author estimates it as less than 80 per cent. If, with acute rheumatic fever, we associate chorea, growing pains, pains in the bones, tonsillitis, sore throat, and, probably, carious teeth, as we are coming to believe is legitimate, if for no other reason, because of their frequent association with heart disease, the proportion must be still greater. Poynton reports from The Ormond Street Hospital for Sick Children, in London, the age limits for admission to which are two and twelve years, that there were admitted, in what appeared to be an epidemic form of acute rheumatic fever, in the winter of 1919 and 1920, 172 cases, and said that 66 per cent of them had signs of organic diseases of the heart, 22 of them died, and 38 became complete invalids, and, he says, "even here we do not get a complete picture of the frequency of rheumatic heart disease, for it is known that many cases occur between twelve and fifteen."

We know of rheumatism only its clinical manifestations and its pathological

anatomy, but that it must be due to the invasions of a microörganism seems, from analogy, a foregone conclusion, though even yet there is no consensus of opinion upon its exact form. Lambert asks if the lessened number of cases of rheumatic fever be not due to the care given to the teeth, throat, and nose in recent years. St. Lawrence, in his study of 100 families in which were one or more known cases of rheumatic heart disease, found other cases of heart disease in the proportion of 14.8 per cent, while in 100 other families studied, in which were one or more cases of known tuberculosis, the other discovered cases of tuberculosis were 14.2 per cent. Contact with rheumatics in this group, therefore, resulted in a greater proportion of cases of heart disease than did contact with the tuberculous of tuberculosis. Sterling, in Guy's Hospital report, October, 1923, says: "In mitral and in aortic disease, or in both combined, the evidence of tonsillar infection in patients under thirty was 81.6 per cent, and 61.3 per cent in patients over thirty."

The symptoms of rheumatism, at times, manifest themselves only in the heart. St. Lawrence says of the 10 per cent of cases of heart disease in rheumatic families that gave no history of having had previously any other form of rheumatism, "it would appear that the exciting cause of heart disease may affect the heart without giving any other clinical expression of the rheumatic infection."

Such statements are of the greatest significance and call attention particularly to the gravity of the rheumatic diseases in children.

Of the other causes, the following report corresponds quite accurately with all studied. In 927 cases there were 331 cases of probable association with rheumatic fever, 207 with acute tonsillitis, 163 with carious teeth, 7 with chorea, 78 with scarlet fever, 47 with diphtheria, 54 with measles, 14 with pertussis, and 122 with syphilis. The cases due to syphilis were over thirty years of age.

This, of course, does not include all possible causes of heart disease. Influenza has been the cause of many cases of heart disease, as has typhoid fever, and all the other diseases produced by microorganisms. Hamilton, from Leahey's Thyroid Clinic in Boston, has shown a rather frequent association of auricular fibrillation with goiter. The common association of goiter with tachycardia and arterial hypertension needs but be mentioned. Several writers question if some of the cases diagnosed in infants as congenital abnormalities of the heart may not be the result of damage done by rheumatism in utero contracted from mothers with rheumatism. A study is being made by Hamilton of heart diseases occurring in earliest infancy to determine if they may be due to an infection carried over from the mother.

The effect of toxins, particularly that of diphtheria, is of great importance, and less so, because temporary in effect, are the poisons of alcohol and tobacco and of some others of organic or mineral origin.

The deaths from heart disease are recorded in mortality statistics, following the International List of the Causes of Death, under four heads: No. 87, "Pericarditis"; 88, "Endocarditis and Myocarditis (acute)"; 89, "Angina Pectoris", and 90, "Other Diseases of the Heart." The printed list of titles under which the cases are reported and from which this classification is made contains 310 separate items, each one of which is an attempt on the part of the reporter to set down his conception of the pathological condition which caused death.

The effects of heart disease are observed in every one of its tissues. The greater frequency of damage to two of them is of sufficient importance to detain us. It is believed that in every case of rheumatic carditis the muscle is affected, as Poynton puts it in familiar words, "by the poison generated by the causative agent which softens the muscle." A muscle so weakened, if it retain power to carry the patient through the stress of the

disease, requires a long period of rest to regain its tone. It is knowledge of this that is not thoroughly appreciated by physicians and not at all by the members of the family of the one stricken.

The second commonest result is a change in the fibrous tissue by contraction of scars at the seat of inflammation. These produce a disabling which impedes the circulation to a greater or less degree, according to that part of the framework involved and to the extent of such involvement. Here, too, rest alone is of value if the extent of the lesion is to be controlled.

The economic and social aspects of heart disease deserve consideration by themselves, because they are of such great importance.

The older medical literature holds a few reports of undoubted cures of cases of heart disease; but in earlier days to discuss the cure of heart disease was unheard of. It was believed that a heart which had once shown evidence of disease was forever damaged. The laity accepted a diagnosis of heart disease as the equivalent of a death sentence, as they did of tuberculosis. The value of prolonged rest for a possible complete healing of a cardiac lesion must be emphasized now, however, for evidence of its efficacy is accumulating. To provide for care for a time long enough to assure complete healing of diseased tissue, or for the greatest possible degree of healing commensurate with the extent of involvement, detention in bed at home, or in a hospital, is the first necessity. As so great a proportion of cases are from the families unable to afford proper care, provision must be made for extended care in hospitals, however great the cost may be. Even then a convalescent hospital in the country should be provided so as to put the patient in the best possible condition before he is returned to his usual life. Those who have had the largest experience in the treatment of heart disease believe that such safeguarding of convalescence would pay the community financially, as well as avert much suffering. Raven, in the London *Lancet* of December 8, 1923, "asserts that it would, in the end, be an economy of time and of money as well as of health if every child who had shown manifestations of rheumatic disease were sent to the country for a long time of rest or quiet life, just as tuberculous cases are sent away."

The tolerance of the heart to physical insult is astounding and is only now but partly appreciated. The limit of the usefulness of one with a damaged heart, even though activities must be lessened, is not calculable.

It has been found to be an error to encourage those who have a healed lesion from tuberculosis to consider themselves no longer able to bear a share of the world's work. In our sanitaria for tuberculosis patients are put at some work as early as it is thought safe, and the degree of effort and the time of employment are increased gradually as their strength returns until the limit of capacity is demonstrated. The final results have been far better under such a system. The great danger of those with damaged hearts is of overworking, not of malingering. If such persons could be brought under a system which included accurate and early diagnosis, prolonged rest during convalescence, and an exact estimate of the capacity of the heart under the strain of work, and frequent periodical examinations to determine how the heart was holding up, there is no question but that they could work longer, live more happily, and defer the day of dependence. Some could do but little, but that little well. For such, an agency for securing appropriate positions must be found, so that the worry of seeking to adjust oneself to the work that can be done may be taken from their burdened minds. Some would require reëducation, and that should be provided.

In taking up the problem of prevention we enter upon a task difficult enough, but rather less so than in tuberculosis. Not all of the causative agents of heart disease are beyond control. Diphtheria and

typhoid fever are within our power. Scarlet fever seems about to yield its secret. The venereal bacteria can be rendered harmless by timely prophylaxis. The ports of entry of the causative agent of the rheumatic diseases are undoubtedly discovered, and they are within easy reach. Bland Sutton, many years ago, showed that the tonsils and the adenoids are not organs with a function essential to life, but that the tonsils are organized plugs to stop up the branchial clefts, those accessory inlets to the respiratory organs which enable certain animals to take oxygen from both water and air; and that the adenoids are other plugs, both crude reminders of our early vertebrate ancestors. Their position at the gateway of the body is always and only a menace. The teeth and the other tissues of the mouth and nose, through which may enter the messengers of disease, can be kept from harboring media. Contact with infectious agents may be avoided often, and all children should be so taught. The harmful results of some infections can be prevented by the timely use of protecting agencies, like vaccination against smallpox, toxin-antitoxin against diphtheria, and vaccines against some of the other diseases more recently conquered. For the rest, it is by the same methods which have proven so marvelously successful in the control of tuberculosis that it shall be possible to prevent heart disease, viz., by attention to every detail of personal and communal hygiene so admirably outlined now for the benefit of those who can and will read. No movement inside the organized medical profession is so hopeful as the one for disseminating amongst the people the knowledge of how to keep well. Carlyle says: "The healthy know not of their health, but only the sick." If, however, the watchword of The National Health Council, "Have a health examination on your birthday," strikes the imagination of our people and they respond to it in large numbers, it is conceivable that a day may come soon when that epigram of Carlyle's shall need explanation.

Those pediatricians are right who assume the duty of examining at least twice a year all the children of the families put under their care. Adults should adopt that custom for themselves and require of their physicians a complete examination often enough to protect their health. Internists should include such examinations for those who employ them. Few adults, however, can be expected to become converted voluntarily to the ways of modern hygiene, so they must be driven to it by necessity through the organizations for which they work. That "the hope of the world is in the children" is true here as well as in every other interest of life. They can be and they must be taught the essentials of personal hygiene, and they must learn it so thoroughly by doing that it shall become a habit from which they cannot break.

The prevention of heart disease can be secured by getting into the conscious possession of the people knowledge we already have, and by stimulating more accurate observations and further study on the part of physicians. The knowledge we already have, and which it is a duty to have as quickly available as are the reflex actions of the spinal cord and to broadcast to the people, may be summarized under the following headings:

1. Heart disease causes more deaths and more disability than any other disease.

2. Heart disease is due to an infection.

3. Infections are more easily contracted by exposure when in a condition of undernourishment, or of fatigue, or when resistance is lowered by an unduly prolonged spell of cold or of hot weather.

4. The danger of infection is greatest in children.

5. Many of the infections which cause heart disease enter the blood stream from diseased tissues in the mouth and nose.

6. All diseased tissues in the mouth can be removed without danger and without damage to the general health, and with

marked improvement and increased safety.

7. All infections should be avoided by avoiding contact with the sick or by active immunization.

8. Heart disease does not always show itself by symptoms which call attention to the heart.

9. Attention to the details of personal hygiene is a protection against heart disease.

10. No person knows whether he is sound or not without frequent health examinations.

Champion, in the *Quarterly Bulletin of the Massachusetts Department of Public Health* for December, 1923, in writing of the prevention of heart disease, says: "While it is not the function of a health department to treat chronic disease, it is most decidedly its function to prevent disease of any kind. The widespread incidence of heart disease is a challenge to our methods of health education."

Until the time shall come when every community shall insist on full protection from preventable diseases of every nature and shall show itself willing to pay the price, those of us who are in advance of that time must make use of methods of education and of prevention other than those granted by the public.

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# A PUBLIC HEALTH EXHIBITION IN SIAM*

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IN 1922, the public health organizations of Siam seized the occasion of the first conference of the Oriental Red Cross Societies in Bangkok to hold a health exhibit. A royal garden was secured, and the National Department of Public Health, the Siamese Red Cross, the local sanitary department, and the medical corps of the army and navy joined in preparing models, charts, pictures, and posters. Visiting health officers brought their best publicity material, and health films and health clowns were brought into use. The exhibit was extensively advertised, and in fifteen days a total of 220,746 people, or about two-thirds of the population of the city of Bangkok proper, had passed through the gates.

Such a united effort was obviously too extensive an affair to be an annual event. But the Health Section of the Red Cross Society was unwilling to allow the interest of the public, once aroused, to lag, and decided to hold a smaller exhibit in 1923, on somewhat different lines. The head of the section is H.S.H. Prince Vallabhakara, who received his medical education in Russia. November was selected, as the end of the rains and the beginning of the cool season. In July a contest was announced in health posters to be prepared by the public. The subjects given for the posters were: The General Public Health Duties of a Citizen, The Dangers of Alcohol, Opium, The Fly, Infant Welfare, and Tuberculosis. Winning posters were to be the property of the section, and others might be bought. Prizes were offered for posters that were "finished" and could be used at once in the publicity work of the society, and for other classes where modifications would have to be made. Meanwhile the Red Cross itself was preparing still other posters of its own, to emphasize certain aspects of hygiene to the public.

The exhibit was held in Wat Pratumkongka, a small temple in a crowded part of Bangkok. This consisted of two chapels in a central courtyard some 200 feet square, around which ran a gallery or corridor facing in upon the court. This "rabieng" is a common feature of Buddhist temples in Siam, and is very convenient for exhibit purposes. All around it were Buddhas, large and small, but the space between the rows of pillars served admirably for the display of posters.

The public responded well to the invitation. The posters submitted were of all degrees of originality and artistic excellence, but many really worth while ones were among the number. Perhaps the best was from the hand of an Italian artist in the Royal Household. This shows a startled woman fleeing from an elephant that has just poked an inquisitive trunk into the kitchen. The poster reminds us that the rat and flies about the woman, to which she has paid no attention, "are really much more dangerous" than the elephant. There were several others sketched by Siamese which were not far behind in merit. The amount of real knowledge and interest in public health displayed by the contestants was gratifying, to say the least. Sometimes the execution might not be finished, but the idea was there.

In addition, the Health Section had forty-one posters of its own to show. These were prepared by boys trained at the Arts and Crafts School in Bangkok, and were intended primarily for the traveling health exhibits the Red Cross was preparing. The subjects mainly treated were Child Welfare and Tuberculosis.

*The observations upon which this paper is based were made with the support and under the auspices of the International Health Board of the Rockefeller Foundation.

"VERY MUCH AFRAID OF AN ELEPHANT, BUT SHE PAYS NO ATTENTION TO FLIES AND RATS WHICH ARE MUCH MORE DEADLY"

Several of the cartoons in *Hygeia* were adapted to Siamese life, and their verses translated. Most of the posters were on "wallboard," but in some of the Red Cross pictures aeroplane fiberboard was found satisfactory. To suit the cosmopolitan character of Bangkok, many of the pictures were lettered in both Siamese and Chinese. There was also on exhibition a series of forty-one pictures on "Modes of Infection and Prevention," which Dr. W. W. Peter of the China Council on Health Education had presented to the Red Cross. These were placed together, and a special booklet was printed explaining them.

The eastern porch of each chapel was used for a special exhibit. One dealt with infant welfare, and public health nurses explained and demonstrated the posters and models. The other had to do with tuberculosis and, besides pictures, contained tin sputum cups made in Bangkok and a display of foods recommended for patients. This was the first appearance of trained public health nurses at an exhibit in Siam.

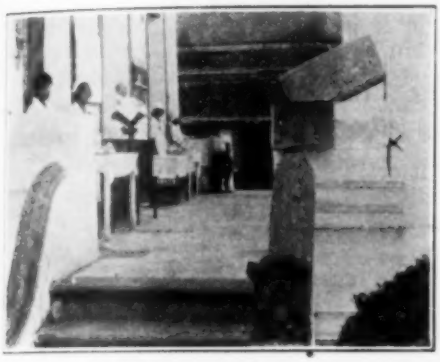
Between the two chapels was an open space, across which a screen was stretched. On this health films were shown continuously, after dark. The subjects included Hookworm, Leprosy, Mosquitoes, Rats, and the Oriental Red Cross Conference.

Two stands sold or distributed books on health subjects. An American trained nurse had adapted and translated a leaflet and a booklet for prospective mothers. There were other pamphlets on Modes of Infection and Prevention of Disease, Hookworm, Filth-Borne Disease, Pit and Pail Latrines, Insect Enemies of Man, and Elements of Hygiene. There was a supply of booklets of the China Council on Health Education, on sixteen varied topics, as follows:

Hookworm
Plague
Sanitation in China
Personal Hygiene
Tuberculosis
Infant Hygiene
Home Sanitation
Cholera

WAT PRATUMKONGKA, BANGKOK, SIAM

Swat the Fly
Venereal Diseases
Malaria
Smallpox
Health Picture Talks
Great Enemies of Man
Flies and Mosquitoes
Modes of Infection and Prevention



CHILD WELFARE SECTION

Altogether 14,145 pamphlets were distributed. A new and popular item at these stands consisted of two postcards bearing the adaptations of the *Hygeia* cartoons mentioned before.

Other divisions of the Red Cross assisted in the exhibition. In one corner of the corridor there were three tables of articles made by the Junior Red Cross to be sent to the Japanese children who suffered in the earthquake. Nurses from the Chulalongkorn Hospital maintained a comfortable restroom. On the west porch of a chapel there was a place where subscriptions might be made to the society.

Just without the temple courtyard was the refreshment section. Here a special effort was made to see that the stalls were kept in sanitary condition. Cartoons emphasized this, and the Health Section itself ran a model stand. At intervals health clowns gave a performance, explaining to each other and to the listening audience the nature of germs and the necessity and the desirability of hygienic practices.

The practical details of the exhibition were well managed. Visitors entered from the main street through a gate at which the attendance was registered on an occidental turnstile. After examining the posters and exhibits around the central courtyard they passed through the refreshment section, thence through an exit to the street again. The whole place was brilliantly and artistically beflagged and lighted with electricity. Two bands were lent by various governmental departments in turn. They were stationed in the courtyard and among the food stalls, and alternated in playing.

The exhibition opened on November 9th. It had been planned to run nine days, but because of the disturbance caused by the unusually late rains the time was extended four days, so that it finally closed on the 22d. The gates were opened each day at 1, for school children, and at 3 for the general public, closing at 11. In the afternoon admission was free, but after 7 a charge of twenty-five satangs was made, or about ten cents. Persons wearing the badge of membership in the Red Cross, however, were always admitted without charge. The total attendance for the fourteen days was

INFANT FEEDING SECTION

72,214. The rains, the location in the Chinese quarter, and a rather inadequate advertising campaign, held these figures down greatly. There was little of official boosting, and "the general public" made up the principal attendance.

# THE EXAMINATION OF THE SCHOOL CHILDREN OF OLMSTED COUNTY

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FROM the examination of over 4,000 school children during the school year of 1922 to 1923 in Rochester and Olmsted County, it has been possible to gather considerable data concerning 3,943 children. Preventable and remediable physical or mental defects were found in 82 per cent of the city children, and in 73 per cent of the country children.

## HISTORY OF MEDICAL INSPECTION IN THE SCHOOLS[7]

France, in 1842, was the first country to establish the medical inspection of schools. At this time physicians gratuitously inspected localities and the general health of the school children. In Paris and surrounding districts, in 1884, salaried physicians were placed in charge of the schools. This organization served as a model for other French cities. In Brussels, Belgium, in 1874, school physicians were required to visit schools three times a month, and dentists and oculists were likewise appointed. This system was copied in Antwerp, Lorain, Liège, and also in Switzerland. In Germany, in 1867, a beginning in medical inspection was made in Leipsic and Dresden, but it was not until 1889 that the epoch-making Weisbaden system was developed. This system provided for a careful and thorough physical examination of each child at the time of entering school, and for reëxamination in the third, fifth, and eighth years of school.

In Hungary, the law of 1887 provided for school physicians, while in Austria medical inspection was an affair of the state. In Norway, since 1891, pupils have been examined three times a year, special attention being paid to causes of absences from school. Since 1878, school physicians in Sweden have been required to examine children at the beginning of the term and to report the results. Roumania decreed, in 1899, that special physicians should examine all school children at least once a year. Moscow has had school physicians since 1888. The medical inspection act of England, in 1908, applied to all public elementary schools and provided for a complete system of medical supervision. Cairo, Egypt, in 1882, Chile in 1888, the Argentine Republic and Japan in 1898, made provisions for salaried school physicians.

In the United States, in 1908, but two states, Massachusetts and Connecticut, had statutes relative to medical inspection of school children. Boston, in 1894, had the first regular system of medical school inspection, although in New York, in 1894, the first medical inspector of schools in this country had been appointed. In 1908, outside of Massachusetts, where systems of medical inspection existed in practically every city, seventy cities had systems of medical inspection. From 1908 to 1915, twenty-one states secured some form of legislation on medical inspection or examination of school children for defects.[20] Among these twenty-one states there were 750 cities having some form of medical inspection. At present forty states are organized for medical work in the schools, and in twenty-five states such work is mandatory. About one-half of the cities of the United States have medical inspection, but only a few states have it in rural communities, although these schools comprise more than one-half of the school population.[27]

It was not until the last session of the legislature of the State of Minnesota that physical and health education was made a state function, and hence placed in the hands of the Department of Education for

administration. At the present time Minneapolis has eight part-time school physicians. These physicians conduct medical examinations of school children daily from 9 to 12 A.M. Every child is thoroughly examined in the first eight years of school, namely, while in the kindergarten, the first grade, and the sixth grade. In St. Paul the school health program is less complete. Here there are five part-time school physicians. A general examination is not made of all children. However, the state aid cases, children who are blind, deaf, have speech defects, or are mentally defective, as well

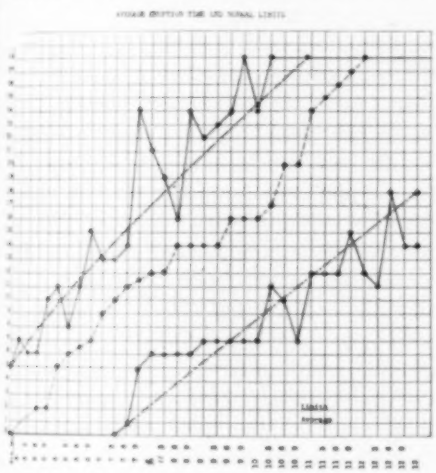

FIG. 1. Erupted permanent teeth charted in three-month periods to show normal limits and average time of eruption.

as those who are more than 7 per cent below normal weight, are examined. In Duluth, the third largest city of the state, there are two part-time school physicians who are assisted by seven school nurses. There are also two school dentists and two dental assistants. In some of the more wealthy small towns, such as Hibbing, Virginia, and Eveleth, a full-time physician is employed. However, in most of the small towns, the county and school nurse acts in the capacity of school physician and nurse. These nurses advise parents as to the more noticeable defects, and in needy cases can have defects treated gratuitously by physicians, or at the expense of the state. On the whole, Minnesota is well manned with public health nurses. Even in the less populated districts of the Iron Range and St. Louis County, there are twenty-one school nurses and nine village and county nurses. In Olmsted County there is one public health nurse whose activities are limited to the county outside of Rochester, a school nurse and one infant welfare nurse for the city of Rochester. Statistics and observations on various defects found in the 3,943 children are given.

### TEETH

*Eruption of Teeth.*—Observations as to the time of eruption of the permanent teeth were made on 3,000 school children between the ages of five and thirteen years. The curves in Figure 1 represent the limits in the time, and the average time of eruption of the permanent teeth. The number of teeth erupted are charted in three-month periods. It will be seen that there is marked irregularity in the time of eruption. For example, in one case all four six-year molars may have erupted by the age of five years, whereas in another they may not be in place until seven years and nine months, the average time of eruption being at the age of six years. Again, all twenty-eight permanent teeth may have erupted as early as nine years and nine months, or may not be in place even at the age of thirteen years, twelve years being the average age for full eruption.

In fifty cases of marked rachitic chest deformity the limits in the time and the average time of the eruption of the permanent teeth did not differ from that shown in Figure 1. No cases fell outside these limits of normal variation. This is contrary to the prevailing opinion that in cases of rickets the permanent teeth, as well as the deciduous teeth, erupt late. Dewey, in his textbook on "Practical orthodontia," says that the permanent teeth in such cases erupt tardily.[8]

Not only was there a variation in the time of eruption, but there was also a

marked variation in the order of appearance of the different permanent teeth. A careful study of these variations, together with the percentage of the eruption of the different permanent teeth at various ages, based on 4,850 cases, has been made by James and Pitts in England.

*Malocclusion.*—Three hundred forty-five (9 per cent) of the children had severe malocclusion. Fifty per cent had moderate malocclusion. According to Lyons, 65 per cent of 267 children between the ages of five and fifteen years passing through the Department on Dentistry of the Mayo Clinic had malocclusion, 85 per cent of which was thought to

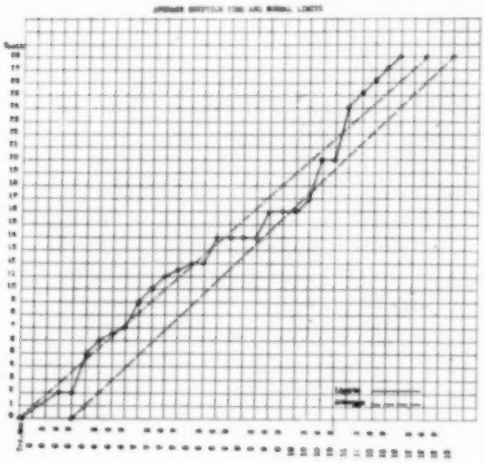

FIG. 2. Erupted permanent teeth charted in three-month periods to show the average time of eruption. The upper dotted line represents the mean of this curve; the lower dotted line, the average time of eruption usually given in dental textbooks.

be due to early extraction or to loss of decayed deciduous or permanent teeth.

With regard to inherited, congenital, and acquired causes, Dewey says that "from the standpoint of biology, anatomy, histology, and embryology, there is no evidence that malocclusion is inherited." He has not observed any cases that could not be classified as either congenital or acquired. Many authors differ with Dewey on this point. However, there is no doubt but that inherited malocclusion is exceedingly uncommon. Rarely in this study was the absence of certain teeth a factor in malocclusion. Among the 3,943 children there was an absence of certain permanent teeth in only twelve (0.3 per cent) of the 4,000 examined. In eight of these children the missing teeth were upper lateral incisors. In only one child were supernumerary teeth present, these being two upper lateral incisors. Statistics of these conditions cannot be considered accurate, as many of the children were too young to show, without examination by the X-ray, whether permanent teeth would be absent. In several children certain permanent teeth were believed to be impacted; this was confirmed by X-ray examination in three, but in most cases the supposition could not be confirmed. Impaction of the bicuspid and canine teeth seemed to be most common, although in one case an incisor was impacted, and in another a six-year permanent molar was impacted against a deciduous molar.

*Aplasia.*—Various forms of aplasia were seen in the permanent teeth. The so-called collar and sleeve deformity, of which the mulberry molar is a six-year molar manifestation, was present in twenty children (0.5 per cent). The upper half of the crown was defectively enameled, often a mere jagged stump. In one child the deciduous canine teeth alone were affected. In the other nineteen children the six-year molars and the incisors were affected, while the first permanent bicuspids and the canines, if erupted, usually showed this deformity. The second bicuspids and the second permanent molars had erupted in four of these children, but none of the teeth were deformed. I cannot agree with Wall and other authors, that the mulberry molar is a stigma of congenital syphilis.[25] In none of our cases was there a history of stigma of syphilis, and five children who had Wassermann tests all gave negative reactions.

Defective enamelization in the form of severe multiple pitting was present in only ten (0.25 per cent) of the children.

Four of the thirty children with dental aplasia had low intelligence quotients and were in opportunity classes.

*The Fifth Cusp.*[3]—The so-called fifth cusp was frequently seen on the upper deciduous molars, on the upper six-year molars, or on both. It occurred in 50 per cent of all children. Extreme variation in the size of this cusp was noted. Black asserts that this cusp is always bilateral and that the parents of these children always have it. This finding was not borne out by the present series. In several cases the phenomenon was unilateral; in other cases parents were examined, and were seldom found to have the cusp. From the dental viewpoint the cusp is of no practical importance, but from the medical viewpoint it is occasionally mistaken for a stigma of disease.

According to Sabourand, the fifth cusp is invariably associated with hereditary syphilis. He found that twenty patients with this cusp invariably had a positive Wassermann reaction. The incidence of the cusp in 50 per cent of school children would seem to prove conclusively that it has no relation to hereditary syphilis. Mozer and Chenat, and Mantoux, did not agree with Sabourand, but evidently did not appreciate the frequency of the fifth cusp, as Mantoux merely says that the cusp is far from a certain sign of syphilitic heredity. Embryologically considered, the fifth cusp is as much an atavistic remnant as is the Darwinian tubercle on the auricle of the ear.[19]

*Upper Central Incisors.*—A study of the permanent upper central incisors has also been made on account of the importance of these teeth in the diagnosis of congenital syphilis. It was found that in 12 per cent of children digitations were present, regular, and of full height. In 48 per cent the digitations were slight or absent, and the biting edge of the tooth straight and even. In 40 per cent the digitations were irregular, or the biting edge was irregular and uneven. In this last group the teeth often resemble Hutchinson's teeth, and are therefore occasionally responsible for the incorrect diagnosis of congenital syphilis. A definite diagnosis of congenital syphilis cannot be made from the teeth unless there is a central concavity on the biting edge. Converging sides instead of the normal diverging sides and anteroposterior thickening are important, but the former occurred in 12 per cent of normal children. Figure 3 illustrates the various types of upper central incisors.

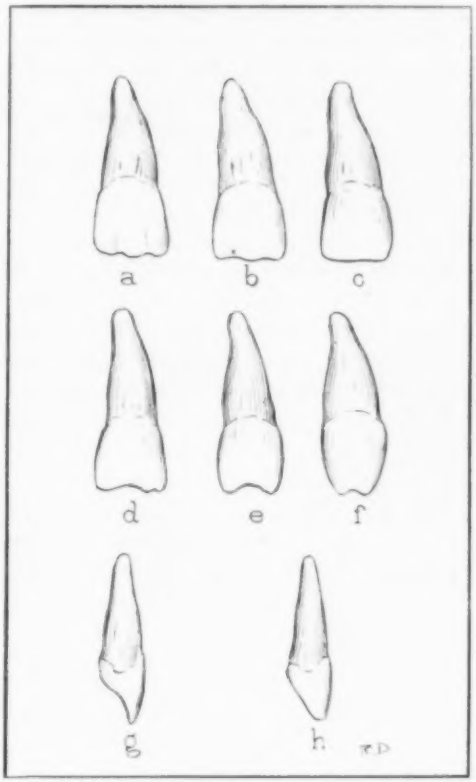


FIG. 3. a. Normal serrated upper central incisor (12 per cent).
b. Normal slightly serrated upper central incisor (48 per cent).
c. Normal central incisor without serrations (48 per cent).
d. Central incisor with uneven serrations simulating Hutchinson tooth. It may have converging edges (40 per cent).
e. Hutchinson tooth.
f. Hutchinson tooth.
g. Lateral view of normal central incisor.
h. Lateral view of Hutchinson incisor.

*Dental Caries.*—Dental caries was by far the most common and serious of the defects. One thousand seventy-seven (78 per cent) city children and 1,782 (70 per

cent) country children had carious teeth. Of the children with sound teeth only 22 per cent were more than 7 per cent underweight, while of those with decayed teeth 30 per cent were underweight. It will thus be seen that dental caries is less common in the country, and also that it is a probable cause of underweight. Country children, as a rule, get more out-of-doors exercise, keep better hours, eat more substantial food, and are less subject to infections.

As the six-year molars are the keystones of normal occlusion, decay of these teeth was especially noted. Seventeen hundred children (43 per cent) had cavities or fillings in these teeth. It was observed of the younger children, with only one or two six-year molars decayed, that the other six-year molars, as yet undecayed, were usually poorly developed.

Broken-off permanent incisors were observed in eleven children (0.3 per cent). All but two of these had decayed six-year molars, which would seem to indicate that poor development, as well as trauma, was a factor.

### UNDERWEIGHT AND OVERWEIGHT

There was little difference with regard to underweight between children from the city and those from the country schools. A variation of 7 per cent below standard weight, as measured by the Wood scale, was considered normal. Sixty-eight and eight-tenths per cent of city children and 68.3 per cent of country children were accordingly of normal weight. Twenty-nine and four-tenths per cent of city children and 30 per cent of country children were more than 7 per cent underweight. Of the entire group of underweight school children 10 per cent did not have foci of infection that could be demonstrated. No correction of the Wood scale was made for nationality, as Rochester and Olmsted County contain an almost representative group of mixed races.[9]

In the tabulation of obesity all children over 25 per cent above weight were considered abnormal. In the city twenty-five children (1.8 per cent) and in the country forty-three children (1.7 per cent) were more than 25 per cent above weight. In this group the two youngest were six years of age. However, thirty-five were ten years of age or younger. It is, therefore, seen that over 50 per cent of the overweight in children occurs before the approach of puberty. The variation in overweight was from 25 to 100 per cent.

### TONSILS

The statistics, compiled in Table 3, show that in Rochester 29 per cent of the school children have had their tonsils removed, whereas in the country only 8 per cent have had them removed. The exceedingly high percentage of removal in the city was probably owing to the fact that Rochester is a medical center and that many pupils are the children of physicians; 80 per cent of the school children of physicians have had tonsillectomies.

It was the aim of the school physician to be conservative in advising the removal of tonsils.[8] However, because they were definite foci of infection, or because they were producing signs of obstruction, it was found necessary to recommend their removal in 10 per cent of the city children and in 16 per cent of the country children. This is an exceedingly high percentage of condemned tonsils in the city when one considers that 29 per cent of the children had already had their tonsils removed. Over one-third of the school children in the city had had, or required, tonsillectomy, while not one-fourth of the school children in the country had had tonsillectomy or required it.

Difficulty was experienced in the interpretation of cervical adenitis, not a single case of which was definitely diagnosed as tuberculous adenitis. Slight enlargement of the anterior cervical nodes was found in practically all children. When such nodes were abnormally large it was usually assumed that they had become so as the result of dental or tonsillar infection, and if the tonsils were questionable, or if

dental caries was present, treatment was advised. Many such children apparently had normal tonsils and teeth. It is possible that some of them had tuberculous adenitis.

The percentage of children who were underweight was only slightly higher in the group with large or infected tonsils than it was in the general group; in the city 30 per cent, and in the country 38 per cent. Twenty-eight and one-half per cent of the city children and 39 per cent of the country children who had had their tonsils removed were more than 7 per cent underweight. The difference in these percentages may be due to the fact that the parents of city children often have tonsils removed as a prophylactic measure. In the country, on the other hand, parents as a rule pay little heed to throat infections, and are often prejudiced against operations on the tonsils.

It was found that tonsillectomy was locally unsuccessful, with tags left after operation in 5 per cent of city children and in 10 per cent of country children. Approximately 70 per cent of the tonsillectomies had been performed by nose and throat specialists, and in less than 1 per cent of these tonsillar tags remained after operation.

### GOITER

As Rochester and Olmsted County are in the second zone of the goiter belt,[14] it was considered important to obtain statistics on the prevalence of goiter among school children. A sample of drinking water from Rochester was examined by McClendon of the University of Minnesota, who found that iodin was present in less than 1 to 1,000,000,000. Four and four-tenths per cent of the city school children and 8 per cent of the country children were found to have more or less enlargement of the thyroid gland. An average of 22 per cent of these children were nine years of age or under, while 78 per cent were between ten and fourteen years. On the basis of four grades of enlargement, 17 per cent graded two or more. Twelve per cent of the total number of goiters was found in boys.

It is noteworthy that not a single case of adenomatous goiter was discovered. Three children with probable exophthalmic goiter were observed, but they all presented mild symptoms, and the diagnosis was not established. Also one case of cretinism and one case of possible myxedema were seen.

### SPEECH DEFECTS

One and three-tenths per cent of the children examined had speech defects. This is slightly above the 1 per cent given by Blanton, whose statistics include mentally deficient children. In the present series stuttering or stammering, lisping, letter substitution, and the continuation of baby talk were included. Two cases with slight speech defects as the result of cleft palates and harelips, which had been repaired, and slight defects due to nasal stenosis, were not included. Twenty-eight cases (2 per cent) of the children in the city, and twenty-five (1 per cent) in the country were found to have speech defects. Stuttering or stammering and lisping were much the more common defects, comprising 68 per cent of the speech defects of city children. Seventy-four per cent of these were between five and eight years. Three children (10 per cent) had low intelligence quotients and were in the opportunity classes. In the country none of the children with speech defects were listed as mentally deficient; however, the intelligence quotient was not obtained in the country. It was found in the school examinations that a quick analysis of the speech difficulty could be made by asking the child to say or repeat the letters of the alphabet. Accurate study of the environment in relation to speech defects was not made.

### MENTAL STATUS OF THE CHILD[24]

In Rochester the mental status of the child is determined by employing the Leland Stanford revision of the Binet-Simon intelligence quotient. Such exam-

inations of the intelligence are conducted by trained teachers. The rating is shown in Table 6. In Rochester ninety-one children (6.5 per cent) had an intelligence quotient below eighty. Most of such children are mentally deficient, although an occasional one may be only maladjusted or mentally backward, due to physical defects.

In the country there were no facilities for obtaining the intelligence quotients, and it was, therefore, only possible by the more crude methods of physical examination and hurried observation to find forty-eight children (1.8 per cent) with mental deficiency. With proper examination this percentage might have been higher. According to the report of the New Hampshire Children's Commission, in 1914, feeblemindedness was more common in the thinly populated counties.

The physical condition of the group of children mentally defective presented certain differences from that of the general group. Of the ninety-one children in Rochester with an intelligence quotient below eighty, twenty (22 per cent), in contrast to the 30 per cent in the general group, were more than 7 per cent underweight. In the obese group there were five children (5.5 per cent) in contrast to the 1.8 per cent in the general group, who were more than 25 per cent overweight. Also thirty-two children (35 per cent) had sound teeth as contrasted with 22 per cent of the city children with sound teeth in the general statistics. There were three children (3.3 per cent) with speech defects instead of the 1.3 per cent of the general group. There was one child with arrested hydrocephalus, two with microcephaly, and four with a history of frequent convulsions.

### DEFECTIVE VISION

By the use of the Snellen test type 380 children (9.6 per cent) proved to have defective vision. Thirty-eight per cent of these wore glasses, but in only 43 per cent was the defective vision corrected by the glasses. Defective vision was found more commonly in the country children, being present in 11 per cent, as contrasted with 7 per cent of city children. Internal strabismus was present in 1.6 per cent of all children examined, and constituted 11 per cent of the cases of defective vision. Most of the children with strabismus had permanently lost more or less vision in one eye. However, in the kindergarten and first grade children this was not so often the case, and special effort was made to see that the children with strabismus were seen and treated early by the oculist.[16]

Besides errors of refraction, external diseases of the eye were present in 118 children (3 per cent). The most common of these diseases were blepharitis and common styes. Two children were seen with chalazions and two with chronic dacryocystitis. Two children had interstitial keratitis, one had syphilitic iritis, two had corneal opacities, one had staphyloma due to injury, and one had had an eye enucleated following injury.

### HEART DISEASE

Organic heart disease was found in only forty-six children (1.2 per cent). The pediatrician's appraisal of a child's heart at one examination, however, is far from perfect. It may be, therefore, that many early cases are missed, or that real organic disease is often interpreted as functional or *vice versa*. In all but two of the forty-six children mitral systolic murmurs were heard, and the diagnosis of mitral insufficiency was made. In the two exceptions it was believed that the condition was congenital heart disease. No statistics on the presence of functional murmurs have been arranged. These were so common, especially in the younger children, that they were considered of little importance; however, notes were always made so that these children may be observed each year.

### CHEST DEFORMITIES AND POSTURE

Various types and degrees of deformities of the chest were seen in approx-

imately 203 children (5.1 per cent). In only ten of these (5 per cent) was the deformity so marked as seriously to compromise the space in the chest cavity. Some of these severe deformities may have been due to congenital anomalies, or to old respiratory difficulties rather than to rickets. In three cases the chest was so deformed that the heart appeared to lie entirely to the left of the sternum. Rachitic deformities consisted of the so-called pigeon and funnel chests, a combination of these two deformities with the presence of Harrison's groove being the most common. Seventy-two per cent of the chest deformities occurred in the children of the kindergarten and the first and second grades, demonstrating the known tendency to outgrow such defects. No marked, rachitic defects such as knock-knees, bow-legs, and deformed heads were noted.

Faulty or careless posture was common, being the rule rather than the exception.[23] Faulty posture of a mechanical rather than a functional nature, such as lordosis and scoliosis, was less common. Data on these deformities are not very reliable, since this was the first year of medical inspection, and many of the children, especially the girls, were not entirely unclothed. Records, therefore, show only fifty-nine (1.5 per cent) of children with lordosis and thirty-nine (1 per cent) with scoliosis.

### ORTHOPEDIC DEFORMITIES

Four hundred sixty-five children (12 per cent) had flat or weak feet of varying degrees.[11] In the diagnosis of flat feet it was considered important to have the child stand with weight equally distributed on both feet and with the toes straight ahead.

Several children with other orthopedic deformities were seen. Five had equinovarus deformity of the feet, all but one having had treatment with helpful results. Thirty-eight children (about 1 per cent) had varying degrees of residual paralysis following infantile paralysis. One child had an equinus deformity as an accompaniment of a Marie-Charcot Tooth syndrome. One child had congenital absence of the fibulae and shortening of the femora with faulty development of the pelvis. Only five children were seen with tuberculosis of bones and joints.

### DISEASES OF THE SKIN[18]

Diseases of the skin occurred in 197 (5 per cent) of the children:[21]

| | |
|---|---|
| Scabies | 65 |
| Impetigo contagiosa | 29 |
| Pediculosis | 17 |
| Acne vulgaris | 16 |
| Chronic and infectious eczematoid dermatitis | 16 |
| Ring-worm (trichophytosis) | 10 |
| Berrucous planus | 8 |
| Herpes simplex | 8 |
| Scars from burns | 6 |
| Keratosis pilaris | 5 |
| Eruptions of exanthematous disease | 5 |
| Nevus vascularis | 4 |
| Seborrhecic dermatitis | 3 |
| Urticaria | 1 |
| Icthyosis | 1 |
| Neurofibromatosis | 1 |
| Psoriasis | 1 |

It may be noted that scabies was the most common disease. The common warts, or verrucae vulgari, were probably more common than scabies, but as the condition was considered of little importance no data were obtained. The statistics on the eruptions of exanthematous diseases are of little relative importance here. Most eruptions are readily recognized by the teacher or parent, and the children are kept at home. However, during the medical examinations three cases of chicken pox, one of measles, and one of scarlet fever were suspected from the skin eruptions. The parasitic skin diseases, together with impetigo contagiosa, were without doubt the most troublesome, and the parents of such children were advised to seek proper medical aid. In most cases it was deemed necessary to exclude such children from school until the disease was under control.

### HEARING DEFECTS

There were eight children in the class for deaf and dumb children. As a state law provides for the establishment of such a class in various districts that can furnish as many as eight deaf children, this class draws from surrounding counties bordering on Olmsted County. So far as could be ascertained these children were all congenital deaf mutes, the histories dating back to the first year of life. Examination of the eight patients revealed that the membranes of the ear were normal. Only those who had been under instruction for some time could speak in an understandable manner. This class is conducted by a trained teacher; the children are instructed in lip-reading and speech.

Only nineteen children (0.5 per cent) had unimpaired hearing of the acquired type. If more accurate tests of hearing had been used, more defects might have been discovered. The histories of children who had discharging ears were of little value. So far as could be discovered, the hearing of such children was impaired in all but a few instances.

### MISCELLANEOUS DEFECTS

Other more rare defects were noted. Five children with definite signs of congenital syphilis were examined. Of these, three were under treatment for the disease. Five other children were grouped as possible congenital syphilitics.

Only one patient presented definite signs of pulmonary tuberculosis, an extremely small percentage, showing that the disease was very uncommon in this community, or that diagnosis from physical examination was difficult. Chronic bronchitis was diagnosed in three cases, and acute bronchitis was diagnosed in nine.

Two children had moderately enlarged spleens. As the children were not examined in the prone position many with slight splenic enlargement may have been missed.

Four children had umbilical hernias, six had inguinal hernia, and one had postoperative hernia. Two children had been successfully operated on for inguinal hernia.

Two children had chorea.

### CORRECTION OF DEFECTS

It has been impossible to obtain a complete report of the number of corrections carried out as a direct result of the school examinations of 1922 to 1923.[12]

Statistics obtained from the follow-up records of the city school nurse show that among 1,366 city children corrections were recommended for 1,125 (82 per cent). On the other hand, records of the county nurse show that among 839 country children corrections were recommended for 612 (73 per cent). The visual defects of 17 per cent of the city children, and of 20 per cent of the country children, were corrected. The dental defects of 20 per cent of the city children and of 30 per cent of the country children were cared for. Tonsils and adenoids of 12 per cent of the city children and of 57 per cent of country children were removed. A summary of the corrections shows that recommendations were carried out in a higher percentage of cases in the country than in the city. This, at least, has been true concerning visual and dental defects, although the country has lagged somewhat in the correction of tonsil and adenoid defects. Since parents have promised to have corrections made in many cases, and since it has been impossible thus far to complete the home calls, or the reëxamination, there will doubtless be a higher percentage of corrections later.

### SUMMARY

A statistical study of defects in children, based on the examination of 3,943 school children, is presented.

Figures 1 and 2 show the limits in the time and the average time of the eruption of the permanent teeth of 3,000 school children. In fifty children with severe rachitic chest deformities the permanent teeth erupted within the limits of normal

variation. Dental caries was the most common defect; underweight and tonsillar disease were next. The dental caries was more common in city children, and the children were more often underweight than those without it. Malocclusion was found in 50 per cent of the children examined. Various forms of dental aplasia were observed. The fifth cusp, an ataxistic phenomenon and not a sign of congenital syphilis, was present in 50 per cent of the children. Figure 3 shows the variations in the appearance of the upper central incisors. In 40 per cent of the children the biting edges were irregular, and often resembled Hutchinson's teeth.

One and seven-tenths per cent of the children were obese.

Twenty-nine per cent of the city children and 8 per cent of the country children had had tonsillectomies. Ten and five-tenths per cent of the city children and 16 per cent of those from the country needed tonsillectomy. Seven per cent of the children had tonsillar tags remaining after operation. Only 1 per cent of the 70 per cent of children who had been operated on by specialists had tonsillar tags.

There was incidence of 1.7 per cent of goiter 2 (grade 1 to 4) or larger. Goiter prior to puberty is unusual in this section of the country.

Speech defects and mental deficiency coincided in incidence with reports elsewhere. The intelligence quotient was important in properly classifying and detecting mental retardation. Mentally deficient children had less dental caries and were less underweight than the general group. On the other hand, more mentally deficient children were overweight, and more had speech defects.

Errors of refraction occurred in 9.6 per cent of the children; internal strabismus was present in 11 per cent of the children with defective vision. External diseases of the eye were one-third as common as internal diseases.

A diagnosis of organic heart disease was made in only 1.2 per cent of the school children. The lesion in all but two of these was judged to be mitral insufficiency.

Five and one-tenth per cent had rachitic deformities of the chest. Twelve per cent had flat feet. Five per cent had diseases of the skin, the parasitic and infectious diseases being the most common. Seventeen different skin diseases were observed.

Congenital and acquired deafness was not common.

The extreme rarity of lung, bone, and glandular tuberculosis was conspicuous.

The coöperation of the parents in the matter of corrections was better in the country than in the city.

TABLE 1

CONDITION OF THE TEETH OF CITY AND COUNTRY SCHOOL CHILDREN

| | City | Country |
|---|---|---|
| Children examined | 1383 | 2560 |
| With sound teeth | 306 (22%) | 778 (30%) |
| With carious teeth | 1077 (78%) | 1782 (70%) |
| With sound teeth, underweight | 83 (27%) | 156 (20%) |
| With carious teeth, underweight | 322 (29%) | 552 (31%) |
| With marked malocclusion | 125 ( 9%) | 220 ( 8.6%) |

TABLE 2

WEIGHT

| | City | Country |
|---|---|---|
| Children examined | 1383 | 2560 |
| Normal* | 952 (68.8%) | 1749 (68.3%) |
| Below normal | 406 (29.4%) | 768 (30.0%) |
| Above normal (very obese)** | 25 ( 1.8%) | 43 ( 1.0%) |

* A variation of 7 per cent below standard weight was considered as normal.

** Above normal (very obese) includes all children more than 25 per cent above standard weight.

TABLE 3

CONDITION OF TONSILS

| | City | Country |
|---|---|---|
| Children examined | 1383 | 2560 |
| Tonsils large or infected, removal recommended | 146 (10.5%) | 409 (16%) |
| Tonsils large or infected, child underweight | 47 (32.0%) | 155 (38%) |
| Tonsils removed | 406 (29.0%) | 204 ( 8%) |
| Tonsils removed, child underweight | 116 (28.5%) | 79 (39%) |
| Tonsillar tags after operation | 21 (5.17%) | 21 (10%) |

TABLE 4

SIMPLE GOITER

| | City | Country |
|---|---|---|
| Children examined | 1383 | 2560 |
| Thyroid enlargement | 61 ( 4.4%) | 205 ( 8.0%) |
| Children from 5 to 9 years | 15 (24.6%) | 43 (20.0%) |
| Children from 10 to 14 years | 46 (71.0%) | 162 (75.0%) |
| Size 2 or larger | 17 (28.0%) | 28 (13.0%) |
| In boys | 14 (23.0%) | 19 ( 4.3%) |

TABLE 5

DEFECTS OF SPEECH

| | City | Country |
|---|---|---|
| Children examined | 1383 | 2560 |
| Children with speech defects (all types) | 28 (2%) | 25 (1%) |
| Types of defect: | | |
| Stuttering and stammering | 9 (32%) | |
| Lisping | 10 (36%) | |
| Baby talk | 4 (14%) | |
| Letter substitution | 5 (18%) | |
| Defects occurring in children from 5 to 8 years | 21 (74%) | |

TABLE 6

MENTAL CAPACITY OF CITY SCHOOL CHILDREN AS DETERMINED BY THE LELAND STANFORD REVISION OF THE BINET-SIMON INTELLIGENCE QUOTIENT

| | | |
|---|---|---|
| Children with intelligence quotient below 80 | | 91 (6.5%) |
| Binet-Simon rating: | | |
| Normal | 90-100 | |
| Super-intelligent | 125-150 | |
| Dull | 80-90 | |
| Dull or mentally deficient | 70-80 | |
| Mentally deficient | 70 and below | |

MENTAL CAPACITY OF COUNTRY CHILDREN AS DETERMINED BY PHYSICAL EXAMINATION

| | |
|---|---|
| Children with mental deficiency | 48 (1.8%) |

TABLE 7

VISION

| | City | Country |
|---|---|---|
| Children examined | 1383 | 2560 |
| Abnormal vision | 99 ( 7.1%) | 281 (11.0%) |
| Abnormal vision, wear glasses | 46 (46.0%) | 97 (27.0%) |
| Abnormal vision, glasses correct vision | 21 (45.0%) | 41 (42.0%) |
| Internal strabismus | 21 ( 1.5%) | 44 ( 1.7%) |

TABLE 8

MISCELLANEOUS STATISTICS

| | City | Country |
|---|---|---|
| Children examined | 1383 | 2560 |
| Organic heart disease | 15 ( 1.1%) | 31 ( 1.2%) |
| Rachitic deformities of the chest | 62 ( 4.5%) | 141 ( 5.5%) |
| Flat feet | 152 (11.0%) | 313 (12.0%) |

TABLE 9

CORRECTION OF DEFECTS IN COUNTRY SCHOOL CHILDREN

| | | |
|---|---|---|
| Children reexamined or traced (complete results not in) | | 839 |
| Recommended corrections | | 612 (73%) |
| Recommended corrections for visual defects | 76—cared for | 15 (20.0%) |
| Recommended corrections for dental defects | 554—cared for | 169 (30.0%) |
| Recommended removal of tonsils and adenoids | 209—cared for | 12 ( 5.7%) |
| Total number of defects (eyes, teeth, tonsils) | 829—cared for | 196 (23.0%) |

TABLE 10

CORRECTIONS OF PHYSICAL DEFECTS IN CITY SCHOOL CHILDREN

| | | |
|---|---|---|
| Children examined or traced | 1366 | |
| Recommended corrections in | 1125 (82%) | |
| Correction of visual defects recommended in | 99 | |
| Cared for in | 17 (17%) | |
| Care promised in | 13 (13%) | |
| No home calls made | 69 (70%) | |
| Correction of dental defects recommended in | 1077 | |
| Cared for in | 216 (20%) | |
| Care promised in | 77 (7%) | |
| Not cared for in | 406 (38%) | |
| No home calls made | 378 (35%) | |
| Removal of tonsils and adenoids recommended in | 146 | |
| Cared for in | 18 (12%) | |
| Care promised in | 52 (35%) | |
| Not cared for in | 36 (25%) | |
| No home calls made | 40 (28%) | |
| Orthopedic measures recommended and cared for in | 5 | |
| Total number of defects (eyes, teeth, tonsils) | 1322 | |
| Cared for in | 251 (19%) | |
| Care promised in | 142 (11%) | |
| Not cared for or no home calls | 929 (70%) | |

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# EFFECT OF CONTAMINATIAN AND AGE OF SERUM ON KAHN PRECIPITATION TEST

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## INTRODUCTION

IT MIGHT readily be assumed that contamination of serum combined with age would exert an important influence on the serology of syphilis by precipitation. Just what this influence would be—whether, for example, positive serums would become negative or negative serums positive—could only be determined by experimentation.

In the case of the Wassermann test, it is generally accepted that contamination is the major cause for the development of anticomplementary properties of serums. It is also known that in isolated cases contamination will change negative to positive reactions. Craig,[1] for example, has shown that a negative serum, inoculated with one of the common organisms such as staphylococcus or B. subtilis and permitted to remain for a week at room temperature or for a lesser period in the incubator at 37° C., will frequently become capable of binding complement in the presence of antigen, thus giving a falsely positive reaction. It appears that under these conditions the serum becomes anticomplementary in a special sense, so that with antigen it binds complement, but without antigen it is incapable of binding complement. Considering that in the Wassermann test we are dealing not only with serum and antigen but with carefully titrated amounts of complement, amboceptor and red cells, the occurrence of marked changes in the final reaction, due to comtamination, may be readily understood. The organisms may produce substances in the serum which are by themselves capable of binding complement either with or without the presence of antigen; and the mere binding of complement, as is well known, is not related to syphilis. Numerous substances, such as agar, kaolin, and, indeed, various bacterial suspensions, are capable of binding greater or lesser amounts of complement in a nonspecific manner.

In the Kahn Precipitation Test, so-called anticomplementary properties of serum appear to exert no influence. A serum which is anticomplementary in the Wassermann test may be either positive or negative in the Kahn. It has been observed that blood specimens or spinal fluids reaching this laboratory in seemingly contaminated conditions, and often giving anticomplementary results in the Wassermann test, nevertheless gave specific reactions in the Kahn test. This brought up the question to what extent a serum may be contaminated and still give correct Kahn reactions. The present study was undertaken with a view of throwing light on this problem. It was desired to find whether a degree of contamination can be produced in serums which will give false reactions with the Kahn test. It was further desired to observe the parallel effect on the Wassermann.

## EXPERIMENTAL

In this preliminary study the effect of contamination and age at incubator temperature at 37° C. will be reported. This temperature was chosen in order to bring about an exaggerated degree of contamination—a condition which would be likely to affect the reaction of the precipitation test.

The serums employed were those sent to this laboratory for routine Wassermann and Kahn tests. The results obtained in these routine examinations formed the basis of the division of positive and negative serums. The experiment was divided into two parts. In one series the effect of age and contamination

TABLE I.

EFFECT OF AGE AND CONTAMINATION OF SERUM UPON THE KAHN AND WASSERMANN TESTS.

Negative Serums—Raw Series

| Time of Incubation after 1st Examination | 3 days | | 5 days | | 7 days | | 10 days | | Totals | | Per Cent | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Number of Serums | 26 | | 61 | | 31 | | 24 | | 142 | | | |
| | *K | W | K | W | K | W | K | W | K | W | K | W |
| Serums Remaining Negative | 25 | 21 | 58 | 30 | 29 | 22 | 17 | 10 | 129 | 83 | 90.8 | 58.5 |
| Serums Unfit for Kahn or Anti-complementary in Wassermann | 1 | 5 | 1 | 28 | 2 | 9 | 6 | 12 | 10 | 54 | 7.1 | 38.0 |
| Serums Changing to Positive | 0 | 0 | 2 | 3 | 0 | 0 | 1 | 2 | 3 | 5 | 2.1 | 3.5 |

Negative Serums—Inactivated Series

| Total Number of Serums | 22 | | 74 | | 102 | | 25 | | 223 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Serums Remaining Negative | 22 | 22 | 70 | 72 | 99 | 97 | 24 | 24 | 215 | 215 | 96.4 | 96.4 |
| Serums Unfit for Kahn or Anti-complementary in Wassermann | 0 | 0 | 3 | 0 | 3 | 5 | 1 | 1 | 7 | 6 | 3.1 | 2.7 |
| Serums Changing to Positive | 0 | 0 | 1 | 2 | 0 | 0 | 0 | 0 | 1 | 2 | 0.4 | 0.9 |

*K = Kahn Test
W = Wassermann Test

TABLE II.

EFFECT OF AGE AND CONTAMINATION OF SERUM UPON THE KAHN AND WASSERMANN TESTS.

Positive Serums—Raw Series

| Time of Incubation after 1st Examination | 3 days | | 5 days | | 7 days | | 10 days | | Totals | | Per Cent | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Total Number of Serums | 9 | | 18 | | 16 | | 9 | | 52 | | | |
| | *K | W | K | W | K | W | K | W | K | W | K | W |
| Serums Remaining Positive | 7 | 2 | 8 | 5 | 14 | 10 | 6 | 4 | 35 | 21 | 67.3 | 40.4 |
| Serums Unfit for Kahn or Anti-complementary in Wassermann | 0 | 7 | 0 | 8 | 0 | 5 | 2 | 5 | 2 | 25 | 3.8 | 48.1 |
| Serums Changing to Negative | 2 | 0 | 10 | 5 | 2 | 1 | 1 | 0 | 15 | 6 | 28.8 | 11.5 |

Positive Serums—Inactivated Series

| Total Number of Serums | 5 | | 52 | | 32 | | 10 | | 99 | | | |
|---|---|---|---|---|---|---|---|---|---|---|---|---|
| Serums Remaining Positive | 4 | 4 | 51 | 46 | 32 | 24 | 10 | 7 | 97 | 81 | 98.0 | 81.8 |
| Serums Unfit for Kahn or Anti-complementary in Wassermann | 0 | 0 | 0 | 3 | 0 | 1 | 0 | 1 | 0 | 5 | 0.0 | 5.1 |
| Serums Changing to Negative | 1 | 1 | 1 | 3 | 0 | 7 | 0 | 2 | 2 | 13 | 2.0 | 13.1 |

* = Kahn Test
W = Wassermann Test

was studied with raw serums and in another series with serums previously heated at 56° C. for twenty minutes.

The plan, in general, was as follows: All blood specimens reaching the laboratory up to 1 o'clock on any given day were centrifuged, and the serums pipetted off. These were inactivated for twenty minutes at 56° C. and Kahn tests performed the same afternoon. The Wassermann tests were performed the next day on the same serums after ten minutes' reinactivation. Whenever there was sufficient serum available either in a raw or inactivated state it was utilized for further study. In some cases given amounts of serum were inoculated with different cultures, such as staphylococcus aureus and a gram negative bacillus isolated from contaminated serum. In most cases natural serum contamination was permitted to take place. After periods of 3, 5, 7, and 10 days' incubation, respectively, Wassermann and Kahn tests were performed on the same specimens. The specimens of the raw series were inactivated for 20 minutes at 56° C. before carrying out the tests. Those in the inactivated series were reheated for 10 minutes at 56° C. before each test. As a rule there were insufficient quantities to carry out tests at 3, 5, 7, and 10-day intervals on the same serums. The result was that some serums were examined after 3 and 5-day incubation periods, some perhaps after 7 and 10-day incubation periods, and others after but one incubation period.

Table I presents findings with negative serums after 3, 5, 7, and 10 days' incubation, respectively. In one group the serums were permitted to incubate in a raw state; in another group, in an inactivated state. The findings in the raw series are of particular interest because the changes in the serums due to incubation are most marked. Thus, of a total of 142 examinations, 54, or 38 per cent, became anticomplementary in the Wassermann test, 10 were unfit for use in the Kahn, due to inability to render the serums clear, and 5 serums in the Wassermann and 3 in the Kahn changed from negative to positive. The findings with the originally inactivated group present an altogether different picture. Of a total number of 223 examinations, only 6 serums were anticomplementary in the Wassermann and 7 unfit for use in the Kahn. Furthermore, only 2 in the Wassermann and 1 in the Kahn changed from negative to positive.

In the case of the series of positive serums presented in Table II, of a total of 52 examinations in the raw series 25, or 48.1 per cent, became anticomplementary in the Wassermann and 2 specimens were unfit for use in the Kahn. Six specimens in the Wassermann and as many as 15 in the Kahn became negative after incubation. In the inactivated positive series we again find comparatively little change due to incubation. The total number of examinations was 99. Of this number 5 became anticomplementary and 13 became negative in the Wassermann; 2 specimens changed to negative in the Kahn.

The fact that the changes produced by organisms growing in raw serums are far more marked than in serums heated for 20 minutes at 56° C. prior to their incubation is of interest. It does not speak against the well-known fact that fresh raw serums are inhibitory to the growth of bacteria. As already indicated, the serums employed in these experiments were obtained from blood specimens reaching this laboratory in the mails. The average age of these serums may be said to be two days. Their bacteriocidal properties were therefore probably reduced to a minimum at the beginning of the incubation period.

A parallel series of studies on the effect of contamination and age was also carried out with serums kept at icebox instead of incubator temperature. Both raw and inactivated serums were employed. The lengths of the incubation periods were 5, 7, and 10 days. Of a total of 70 negative raw serums used in this series 3 became

unfit for use in the Kahn and 3 changed from negative to positive in the Wassermann, the other 67 serums remaining negative in both tests. Of 10 positive raw serums studied only one became anticomplementary in the Wassermann and there was no change in the Kahn. Of a total of 50 inactivated serums, including both negatives and positives, there was practically no change in reaction after 10 days' incubation at icebox temperature.

The Kahn precipitation test was carried out in accordance with the recently standardized procedure.[2] The technic of the Wassermann test is also fully described elsewhere.[3]

SUMMARY

It has been observed in the routine Wassermann and Kahn examinations in this laboratory that serums showing contamination, and in some cases giving anticomplementary reactions in the Wassermann test, gave apparently specific reactions in the precipitation test. It was desired to find whether contamination combined with prolonged incubation at 37° C. would affect the reliability of the Kahn test.

Raw serums approximately two days after drawing blood were thereupon subjected to contamination either by inoculating them with various organisms or by permitting natural contamination with air organisms and incubated at 37.5° C. for periods extending from 3 to 10 days. Examinations during these periods with the Wassermann and Kahn tests revealed marked changes in the reactions with the former test and comparatively lesser changes with the latter test. The changes in the Kahn test were in a few cases from negative to positive and in a larger number of cases from positive to negative.

Serums approximately two days old were first inactivated and then subjected to contamination and incubation at 37.5° C., as in the raw series. The effect in this case was comparatively small in both tests.

Similar experiments carried out with an incubation temperature of about 5° instead of 37° C. showed relatively little effect on the reliability of the Kahn and Wassermann tests.

The writer desires to thank Mrs. M. K. Lowe and Miss B. Bartholomew for their help in connection with the experimental work.

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# FLOOD SANITATION IN THE VALLEY OF THE POTOMAC BETWEEN MARYLAND AND WEST VIRGINIA

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DISASTROUS flood and epidemics of disease prove to be some of the most effective means of awakening cities and counties in West Virginia to the need of safe water supplies and properly constructed sewerage systems and to the value of full-time health officer organizations. Counties in West Virginia and Maryland bordering the Potomac River had many serious health and sanitation problems as a result of the Potomac River flood in March.

Mineral County borders on the Potomac River and includes the cities of Piedmont, 4000; Keyser, 7,500; and Ridgeley, 2000. On March 29, 1924, the Potomac River was swollen to unprecedented heights by the melting snows of the Alleghanies and the heavy spring rains. It rushed madly down the valley and tore through these West Virginia communities, causing death to those unfortunate ones caught in its grasp and bringing about millions of dollars of damage to railroad property and industrial plants located along the river valley.

When the flood waters receded, leaving bridges torn away, freight cars and household wreckage strewn along the banks, water supply and sewerage systems out of service or partially crippled, thoughts of protection of the health for the citizens and how to ward off epidemics of typhoid fever and intestinal disease became uppermost in everyone's mind.

Governor Morgan was appealed to by telegram and telephone calls. Red Cross disaster representatives from Washington, D.C., arrived on the scene and telegraphed the needs to the State Health Department. Everyone asked what health organization was available to deal with the distressing flood situation. The answer was "only a part-time health officer system." This, of course, was hopelessly unable to serve in the emergency. It was fortunate in-

POTOMAC RIVER—FLOOD WATERS RECEDING. RIDGELY, W. VA., IN BACKGROUND

deed that the part-time health officer, Dr. Wolverton of Piedmont, was young, active, alert, and resourceful. His part-time services were remarkably effective.

At the request of the Governor, the Red Cross and local health officials in the flooded area, the State Health Department immediately dropped its regular program of work, and from its ranks called immediately into being a fully equipped, full-time public health unit. This consisted of a trained medical officer, Dr. M. V. Zeigler; two experienced sanitary

RESCUING WOMEN AND CHILDREN ON A RAFT

engineers, Mr. E. S. Tisdale, assisted by Mr. F. J. Laverty, and a trained public health nurse, Miss Edna M. Hardsaw. This unit proceeded immediately to the scene of destruction, confusion, and slime left by the river as the flood waters subsided. Space will not allow the description of relief work at Piedmont and Keyser, but a few of the main endeavors of this health unit at Ridgeley, the city most seriously in need, will be outlined.

Ridgeley is a community of 2,000 people, nearly all of whom are employees of the Western Maryland Railroad, one of the worst sufferers from the flood. The town lies opposite Cumberland, Maryland, and is built around a horseshoe bend in the Potomac River. The flood waters were unusually destructive, and three-fourths of the town had been inundated. There was no public water supply and nearly all dug and drilled wells had been flooded and rendered unsafe. No sewerage or drainage system existed and no health officer or physician lived in the city. Furthermore, no funds were available for relief work. A worse situation could hardly be pictured or imagined.

The public health unit supplied to the county by the state to meet the emergency, consisting of a medical officer, two sanitary engineers, and a public health nurse, established headquarters in a centrally located bank building. By means of a largely attended mass meeting arranged and personally addressed by the chief medical examiner of the Western Maryland Railroad, Dr. D. Z. Dunott, the health authorities told the people of the town how the health and sanitation work would be cared for, asked their hearty coöperation, and stated that steps would immediately be taken by the health unit to accomplish the following things:

1. Institute a safe water supply for everyone.

2. Provide temporary comfort stations in the areas where privies were entirely swept away.

3. Clean up and provide every home with sanitary privies.

4. Inoculate every citizen of Ridgeley against typhoid fever free of charge and care for sick persons needing attention.

5. Clean up the débris which lay strewn in confusion in streets, alleys, porches, and yards.

6. Drain the large ponds left in the town by the flood and assist in getting homes livable. This included pumping out cellars which were filled with water.

The coöperation of all the townspeople was heartily given. The program of cleaning up was entered into by everyone.

Confidence was established after the first visit to the headquarters, where the persons saw this health unit distributing packages of chloride of lime, organizing several corps of scavengers for privy cleaning, directing several other corps of carpenters in reconstructing and making sanitary the privies, inoculating the school children against typhoid by the hundreds, and directing the group of sanitary inspectors, consisting of the mayor and councilmen, who were hastily organized and trained for inspection service.

*Water Supply.*—Through the advice and assistance of Mr. Weiss, full-time health officer of Cumberland, the Mineral County Health Officer, Dr. Wolverton, and Red Cross workers, a safe water supply was already being arranged for. When the state health unit arrived on the ground a two-inch temporary water line had already been attached to the Cumberland mains, which furnish a modern, safe, and splendid water supply, and this line was run across the river into Ridgeley. Through local leadership and volunteer services directed by McGruder and Summons, these lines were gradually extended until one or more spigots were placed on nearly every street in Ridgeley. This source of water supply was alone recommended until the sanitary engineers could test and pass upon the well supplies of the community.

*Typhoid Fever Prevention.*—Knowing that unsafe water had been used by many citizens, Dr. Zeigler made immediate preparation to give antityphoid inoculations free of charge. The Cumberland Health Department and Maryland State Health Department had made available antityphoid serum in quantity. Miss Edna M. Hardsaw, the public health nurse, cleaned the arms of the school children, of mothers and fathers, who by hundreds pushed their way into the clinic room. She kept them in single file, the stenographer made out the records as they passed her desk, and Dr. Zeigler administered the preventive treatment. Everything moved smoothly and systematically. The records kept by the clerk enabled her to advise the people by mail just when to return to the office for second and third typhoid treatments. In all over 700 persons received protection against typhoid fever. This work was deemed particularly important, since Ridgeley gave a history of much typhoid in the past.

*Sanitation and Drainage.*—Proper disposal of body wastes was one of the outstanding problems facing the sanitary engineers. No sewerage system existed and much drainage of large impounded bodies of water had to be cared for. After a survey of the community a ditching program to drain away surface water and a pail system with systematic scavenger service was determined upon as the only sanitary means of sewage disposal. This

CANS TO BE USED IN PAIL TYPE—BODY WASTES DISPOSAL SYSTEM

was adopted with the intention of installing a modern sewerage system at the earliest possible time.

Eight temporary comfort stations built at headquarters were immediately located to serve the worst stricken areas; a model privy and privy box with pails in place were built and placed on inspection at the headquarters following the issuance of regulations stating that on and after June 10, 1924, any persons having an insanitary privy on their premises would be subject to a fine.

The sanitary engineers provided cans at cost and scavengers and carpenters were set to work cleaning, disinfecting, and reconstructing the privies of Ridgeley. Three hundred barrels of night soil were removed and disposed of in a safe and sanitary manner. Through the efficient work of the corps of sanitary inspectors the carpenter gangs moved along smoothly in the reconstruction work, and within three weeks' time a placard had been placed on every privy showing it to comply with the regulations of the department. Ridgeley had been sanitated 100 per cent.

*Permanent Improvements.*—What were the accomplishments of this public health unit in respect to protecting the public health of Ridgeley in a grave emergency?

1. Before the unit left Ridgeley sentiment had become definitely crystallized for permanent improvements, a safe public water supply, and a complete sewerage system. A petition by the voters asking that they be allowed to vote on this question was signed by 80 per cent of the citizens. Forty thousand dollars will be made available for these permanent improvements.

2. The privies of Ridgeley were sanitated 100 per cent and a systematic scavenger system installed.

3. Cellars were drained and drainage ditches completed so that no standing water remained in Ridgeley.

4. Over 700 persons, or more than one-third the citizens of the community, received protective antityphoid treatment.

5. A safe water supply was provided until a permanent new system could be installed.

The emergency work of this group of public health workers illustrated specifically to the citizens of Ridgeley and to Mineral County just what a few of the activities of a full-time county public health unit are. A safe water supply was installed, proper disposal of body wastes provided, typhoid fever prevented by serum treatment. If the citizens of the county will continue to coöperate as well with the State Department of Health as during the time of worry, anxiety, and danger during the flood, permanent sanitary improvements will be effected and a full-time health organization grow up, as a result of these flood sanitation activities.

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# SANITARY ENGINEERING PROGRESS IN MARYLAND 1923-24

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THE period of development of ideas and practice in any field extends over so many years that the discussion of the progress in one or two years in a single state is likely to overemphasize minor elements in a major program. Sanitary engineering progress in any state is necessarily a continuous, although slow, process. The writer has no illusions that the data presented below mark more than a single step forward in an orderly march of changes inaugurated more than ten years ago, and which will be pushed further forward in the next ten years. At the same time, such progress as is indicated in the following observations should properly be assigned to the coordinated efforts of a body of men operating in the bureau of which the present writer has the good fortune to be the director. It is with these facts in mind that the scattered observations are presented here by editorial request as interesting, and perhaps helpful, indices of a forward movement in a typical state.

*Water Supply, Sewerage, and General.*—Our efforts toward maintaining the present high standard of water supplies in the state were continued throughout the year. Among those cities which made extensive waterworks improvements were Baltimore City, Frederick, Hancock, Frostburg, Hagerstown, Port Deposit, Annapolis, and in the Washington Suburban Sanitary District. A permit was issued to Baltimore City for the construction of an addition to the existing filtration plant at Montebello. With the completion of this unit the entire supply of the city, including the new annex of 1919, will be brought from the Gunpowder River and the plant on the Patapsco River at Avalon, formerly owned by the Baltimore County Water Company, will probably be abandoned.

At Frederick engineering advice was obtained to make recommendations for an additional supply to carry the city over the annual summer drought. Studies were made and plans submitted calling for the construction of a new earth dam and impounding reservoir on Fishing Creek. The reservoir is to hold 60,000,000 gallons, but is to be so constructed as to permit raising the dam to impound 120,000,000 gallons. The contract for this construction has been awarded and the work is under way. The probable cost of the dam and reservoir will reach slightly over $150,000.

Use of the Potomac River as an additional source of water supply for Hagerstown was approved. The city's engineers are proceeding with plans for this development so that this supply will be available as soon as possible. The improvements will involve several million dollars. Port Deposit changed the location of its water intake on East Rock Run and installed a liquid chlorine apparatus for disinfecting the supply.

A cloudburst on the Annapolis watershed during the summer months washed out the earth dam of the storage reservoir. As similar difficulties have been experienced several times in the past, the Annapolis authorities decided to replace the earth embankments with suitable concrete structures to prevent such recurrences in the future.

The rapid increase in population in the Washington Suburban Sanitary District necessitated placing additional filter units into service at Takoma Park and Hyattsville and the construction of a temporary filter plant of 2,500,000 gallons per day capacity at Burnt Mills. This latter plant will be replaced in the future by a permanent filtration plant for the district. As the construction of this plant would

require some time, and as relief was needed immediately, the plant at Burnt Mills was installed to relieve the load now carried by the Takoma Park and Hyattsville plants.

The Washington Suburban Sanitary District still continues, under the able directorship of Robert B. Morse, its chief engineer, as an excellent demonstration of the financial and engineering advantages of coördinated control of water supply and sewerage facilities for discrete communities. When it is realized that water and sewerage service is being sold at a total cost of only about $25 a year to a property of $5,000 valuation and sixty-foot frontage, it need hardly be pointed out that the metropolitan venture is an undoubted success. The Sanitary District covers parts of Montgomery and Prince George's counties, has an area of ninety-five square miles, a present population of approximately 40,000, and a taxable basis of about $45,000,000.

The sewerage system and treatment plant at Towson, the first installation of this nature to be built in Baltimore County by the county authorities, were completed and placed in operation. The treatment plant consists of primary and secondary settling tanks of the Imhoff type and trickling filter, with the effluent discharging into Towson Run. Several inspections have shown that the works are receiving careful attention and delivering an excellent effluent.

The bureau's efforts to obtain favorable sentiment for the formation of a metropolitan district in Baltimore County contiguous to Baltimore City reached a successful end through the passage, by the 1924 Legislative Assembly, of an enabling act establishing the metropolitan district for water and sewage purposes. This bill is fashioned somewhat after that creating the Washington Suburban Sanitary District. It provides for installation of water supply, sewerage and drainage systems in the thickly built up sections adjoining the Baltimore City limits. The area under consideration includes approximately 50,000 people and the present bond issue authorized will approach $7,500,000. The commission having jurisdiction over the area began to function on May 1 with the appointment of A. E. Waldren as its chief engineer.

*Special Studies.*—Since the functions of this bureau are advisory, regulative, and investigative, special studies are frequently carried out which are of particular interest along one or more of these lines, but which at the same time are distinct from those made in the routine performance of the bureau's duties. A brief summary of these special problems should be recorded.

A number of investigations arise from specific questions, or from complaints concerning an existing or potential nuisance. In the former class may be placed the question of the use of sewage sludge for fertilizer purposes, referred to this bureau for action by the city of Baltimore.

After considerable investigation a report was presented to the State Board of Health on "The Hygienic Aspects of the Use of Sewage Sludge for Fertilizer." In this discussion it was pointed out that the experiments indicate that in a sewage sludge free to undergo normal digestion the typhoid fever bacilli will survive probably less than ten days. The speed with which the typhoid and dysentery bacilli die depends upon the moisture content and reaction of the soil and upon the nature and abundance of other flora. In a dry or acid soil, either moist or dry, most of the pathogenic bacteria will die within ten days.

It has not been possible to determine the length of time tuberculosis bacilli will survive in sewage sludge, because of the difficulties encountered in their isolation. They may have a greater viability than the water-borne types. It is doubtful, however, that the tuberculosis bacilli would survive more than the seven days' digestion period established in the investigation.

In concluding this investigation, I stated that "the laboratory evidence of

recent date would appear to indicate that, if sewage sludge is held in a sludge digestion tank for a period not less than ten days, its application to the soil for fertilizer purposes might be carried out without detriment to the public health through the possible dissemination of vegetable-borne disease." A series of regulations were presented to the city of Baltimore, after adoption by the director of the State Department of Health on May 29, 1923, covering the use of sewage sludge for fertilizing purposes. These regulations are given below:

1. Only such sludge shall be delivered to farmers as has been undergoing digestion for at least ten (10) days.

2. The wet sludge shall be carted in vehicles that are watertight.

3. Sludge shall be used on ground only before crops are planted. It shall not be sprinkled over or brought in direct contact with growing vegetables.

4. A permanent record shall be kept by Baltimore City of all persons obtaining wet digested sludge, date, location of farm, and quantity of sludge taken.

5. The city reserves the right to discontinue at any time the distribution of wet sludge to any farmer.

6. Any person found violating any of the above regulations shall not be allowed to take wet sludge from the disposal plant or to obtain it in any other manner.

7. During those periods that wet sludge is being removed by farmers, the city shall have such inspection of the farms where the sludge is used as to be assured that the above regulations are being enforced. The State Department of Health reserves the right to future review and change in the above regulations.

8. Every person taking wet sludge from the disposal plant shall be supplied with a written statement from the city authorities in which shall be incorporated Sections 1 to 6 of these regulations.

9. All records of wet digested sludge distributed shall be open at all times to the inspection of the proper authorities.

During the past year this bureau has investigated a large number of stream pollution cases originating with the discharge from various types of industries, such as tanneries, distilleries, creameries, canneries, acid manufacturing plants, and the like.

Dating as far back as 1915, a number of industries adjacent to Curtis Bay and the city of Baltimore, through the discharge of raw domestic sewage at two or more points, have been contributing a considerable amount of pollution to Curtis Bay and its tributaries. In order to secure the coöperation of these industries and the city in bringing about an improvement in this condition, a conference was held on January 23, 1923, in the office of the director of public health, at which representatives of these various industries, the city of Baltimore, and the State Department of Health were present.

The various aspects of the problem considered were comfort and health, fish life, and transportation. After considerable discussion the solutions offered to overcome the difficulties were: (a) the establishment of a zone reserved for industrial wastes; (b) the establishment of a fundamental policy with reference to the amount, nature, and treatment of wastes to be discharged, and (c) an independent investigation by the joint industries, with the presentation of recommendations to a second joint conference before June 1, 1923.

Following this conference a committee of five persons was appointed. A number of inspection trips were made and a record of the conditions at the various industries was kept by this bureau. Although no direct results were obtained by the committee as a whole, this bureau benefited materially through the influence of the industrial representatives upon their associates in obtaining the approval of the treatment processes recommended.

The principal industries under consideration were the Walton Tannery, the Davison Chemical Company, the Standard Guano Company, the U. S. Industrial Alcohol Company, the Inter-Ocean Oil

Company, the U. S. Asphalt Refining Company, and the U. S. Industrial Chemical Company, together with the Cedar Street and Curtis Bay sanitary sewers.

At the Inter-Ocean Oil and U. S. Asphalt Refining Companies' plants the skimming and settling tanks for catching the oil wastes before their discharge into the bay were improved over 1920, so that little oil waste escapes.

The Davison Chemical Company is apparently making every reasonable effort to prevent the loss of acid, so that there are now only slight, intermittent discharges of acid of minor importance from their plant.

The Standard Guano Company has been discharging an acid waste and obnoxious fumes. The company is now installing, however, a Cottrell Electrical Precipitator for acid recovery.

The wastes from the Walton Tannery have been regularly discharged without treatment, but during the latter part of 1923 this company signed a contract with the Dorr Company for the installation of screens, thickener, and settling tank, the first shipment of supplies being made the latter part of December.

At the plant of the U. S. Industrial Alcohol Company the "molasses slop" was discharged daily during 1920, but during this year only an intermittent discharge of a highly organic waste has occurred. Considerable funds have been expended at their subsidiary plant to improve these conditions and for the recovery of lost products. At the U. S. Industrial Chemical Company's plant the "molasses slop" is first settled in large tanks partially prepared for Dorr thickeners. These should be fully equipped during 1924. From these tanks the slop is pumped into a series of evaporators, where the 90 per cent water material is reduced to one containing approximately 50 per cent moisture. The effluent from the evaporators is then run into incinerators, where the remaining water is evaporated with the production of a clinker used in the manufacture of potash. The losses from the incinerator, in the form of dust and fumes, are to be recovered by special apparatus. About 85 per cent of this recovery equipment was installed at the close of 1923.

The material settled out of the "molasses slop" is to be by-passed directly to the incinerators when this improvement is completed. The effluent from the evaporators is now discharging at the mouth of Stone House Cove rather than at its headwaters, thereby removing the source of considerable pollution from a stagnant body of water to one more affected by tidal conditions, and consequently affording greater dilution. This change in point of discharge has been made so recently that it has been impossible to compare its nature with that from the old type evaporators. Even if the nature of both liquids is identical, the improvement afforded by the increased dilution will be considerable.

In response to a complaint from Asbestos, Carroll County, this bureau began an investigation of the waste from the Congoleum Company's plant. This company manufactures the cardboard base for the congoleum rugs, using rags as the raw material. In the process approximately 400,000 gallons of highly colored liquid, containing considerable solid material in a suspended and colloidal state, are discharged into the North Branch of the Patapsco River, the effects of which can be seen for two or more miles below the plant discharge.

Although interested in the riparian rights of the property owners along all streams, it is the object of this bureau to obtain a method of treating the various industrial wastes in such a manner as to make the treatment a profitable one to the company producing them.

An investigation of the conditions at the Congoleum Company plant and a laboratory study were made, therefore, with the result that alum treatment alone was found to yield an excellent effluent when the pH value of the liquid is 5.4. That this treatment will produce sufficient residue to offer a margin of profit to the

company, if its value is anything in excess of one-half of 1 per cent per pound, seems apparent to this bureau, when it is known that the return from the "Save-All," a screening device recently installed, gets a considerably greater return per pound. The "Save-All" has been found to remove 70 per cent of the suspended matter formerly discharged, but does not produce an effluent sufficiently clear or nonputrescible to be discharged into the river.

After presenting the results of our investigation to the Congoleum Company the company determined to install the necessary equipment to provide for elimination of these wastes.

Another interesting problem of stream pollution arose in determining the effect of the waste from the Eastern Rolling Mills upon fish life in Back River. This waste consists of the acid waters produced in the manufacturing process, the discharge from the toilets, and the water used for general purposes around the plant.

The product manufactured is sheet metal rolled from soft steel bars. In the process of manufacture the bars of steel are heated in furnaces and then passed through rolling machines until the desired thickness is obtained. These sheets are then immersed in a hot 10 per cent sulphuric acid solution to remove the mill scale, and are then washed off in tanks of fresh running water. It is these two wastes which produce the acid waters.

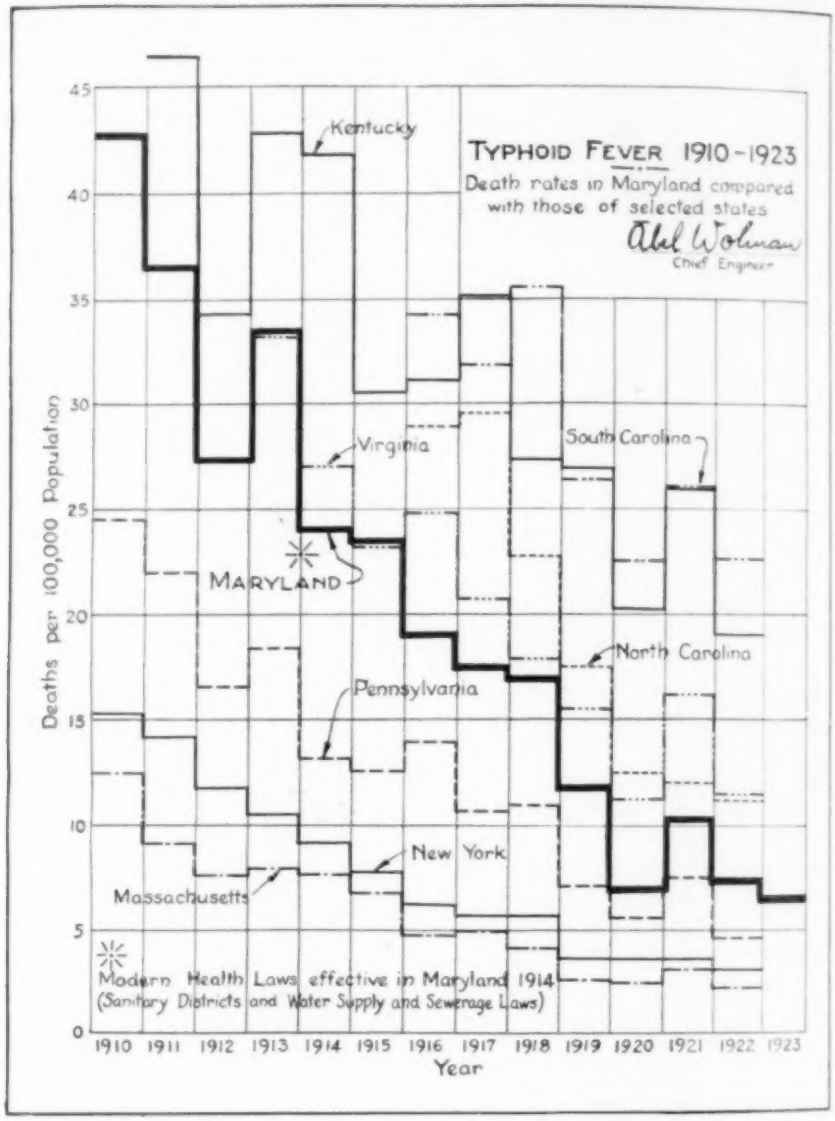
This bureau investigated not only the effect of the factory wastes upon fish life, but its ultimate effect upon the quality of the waters of Back River after a long period of time. In the former of these investigations fishes were placed in boxes at distances of approximately 1,000 and 4,000 feet below the plant discharge for the purpose of observing the effect of the acid wastes upon them. A chemical study of various stations between the plant outlet and the Eastern Avenue Bridge, about 4,000 feet downstream, was made to accumulate data upon the second phase of the investigation.

From the data accumulated the investigators concluded that the waste discharges are highly acid and contain much iron and suspended matter, and that the effect of the acid discharged does not at this time extend to any great distance below the plant. They concluded further that fish life is not seriously affected by the wastes except near the sewer outlet, but that the acid discharges will cause the corrosive properties of the water to increase. This may cause a financial loss to other manufacturers who may use this water at some future time.

Following their findings, it was recommended that the sanitary wastes be separated from the acid discharges, the former to be disposed of into the Back River sewer, with the wastes, other than acid or sanitary, to be emptied into Back River without treatment. Because of the success attained at other plants in the use of mechanical scale removers and the utilization of by-products, it was further recommended that the various possible methods of operation be investigated. As this work was not completed until December 5th, there had been no action taken by the Eastern Rolling Mill officials prior to the close of 1923.

The study of a creamery waste from a plant located at Cecilton was begun along the lines of hydrogen ion control, with the intention of using these results as the basis for the design and operation of treatment works. Although this investigation has not progressed sufficiently far to make any definite conclusions, it has been demonstrated that the creamery wastes, when adjusted to a pH value of 4.7, are rapidly precipitated, with the production of a clear effluent.

Still another stream pollution problem confronted this bureau at Eastview, Carroll County, where the chenopodium plant is grown and distilled for the production of oil of chenopodium. It was contended by the plaintiff in this case that fish were being killed by the escaping oil. Our in-




vestigation leads us to believe that because of the high value of this oil very little is allowed to escape. Unless a film is formed over the body of water into which these wastes are said to discharge, thereby cutting off the supply of oxygen, it would seem that the toxic nature of the oil must kill such fish as are killed. In order to learn definitely of the effect of the chenopodium oil upon fish life, a series of laboratory experiments has been conducted during 1924, using various percentages of this oil mixed with the water and several kinds of fish. This report will soon be published.

*Typhoid Fever.*—There are inserted below the records of mortality from typhoid fever in Maryland, and in Maryland exclusive of Baltimore City. It is particularly gratifying to point out that the typhoid fever death rate in the year ending December, 1923, is the lowest in the experience of the state. It is still higher than it should be, but the near future

holds promise of improvement over the activities of past years, when the advent of more full-time county health officers will serve to extend the accomplishments of the deputy state health officers and engineers since 1914.

For purposes of comparison with neighboring states in the registration area, a chart is attached to this report which compares graphically the typhoid fever record of Maryland with that of selected north Atlantic and southern states for the period of 1910 to 1923. This chart has been prepared to indicate the accomplishments of states with and without large negro populations. It is pertinent to report that of the nine states in the registration area of the United States showing adjusted rates by color, the lowest rate for the white population in 1922 was 5.9 and the lowest for the colored was 13, both for Maryland. The adjusted rates for 1923 have not yet been reported. (The above adjusted rates were obtained from Public Health Reports, Vol. 39, No. 1, Jan. 4, 1924, U. S. Public Health Service.)

TYPHOID FEVER—DEATHS PER 100,000 POPULATION 1910–1923

| Year | Maryland | Maryland Exclusive of Baltimore City |
|---|---|---|
| 1910 | 42.8 | 43.5 |
| 1911 | 36.6 | 43.8 |
| 1912 | 27.4 | 30.2 |
| 1913 | 38.9 | 41.5 |
| 1914 | 24.1 | 25.6 |
| 1915 | 23.5 | 25.9 |
| 1916 | 19.1 | 20.6 |
| 1917 | 17.5 | 19.5 |
| 1918 | 16.9 | 21.1 |
| 1919 | 11.7 | 15.3 |
| 1920 | 6.9 | 9.1 |
| 1921 | 10.5 | 15.9 |
| 1922 | 7.3 | 10.7 |
| 1923 | 6.5 | 8.7 |

## EXCUSED FROM VACCINATION ON ACCOUNT OF HEMOPHILIA, CONTRACTED SMALLPOX

In over ten years' experience in public health work the following is the first case I have seen of smallpox where the victim was never vaccinated on account of hemophilia. I am accordingly reporting it. I doubt that vaccination carefully done by the puncture method, avoiding the drawing of blood by too deep pricks, would have been contraindicated in this case.

E. G., age fifteen, white, was admitted to the Little Rock General Hospital on February 1, 1924, for a severe hemorrhage due to hemophilia. He had a strong family history of hemophilia; two twin brothers had bled to death from a minor injury; one living brother, a maternal uncle, and one nephew all have the disease. E. G. Always sickly. At two years cut his lip and bled for nine days, almost died. Has nearly always bled excessively, for eight to ten days when skin was broken or cut at all. E. G. Bleeding wound of the right hand. About a fortnight ago he stuck a nail into his palm; has bled beneath the skin ever since, forming a large hematoma in the palm. This ruptured finally and the hemorrhage could not be controlled by three tight bandages on the forearm. The bleeding was finally stopped the day after admission by local application of thromboplastin and 20 c.c. given intramuscularly. The coagulation time on admission, February 1, was 14 minutes, 30 seconds. Next day fell to 6 minutes, on February 3 to 3½ minutes, but not below 3 minutes by February 17.

April 9, after a stay of nearly ten weeks in the City Hospital, this boy came down with mild smallpox, which must have somehow been contracted from a previous case in the institution. There was nothing remarkable in his smallpox; it did not cause any hemorrhage and ran a very mild course, as most cases do nowadays.

Dr. M. E. McCaskill was in charge of this case, and I am reporting it with his kind permission on account of its public health interest. When the boy came down with smallpox he exposed about a dozen patients and visitors in a general ward, but prompt vaccination prevented any further cases then. Later, however, a woman in the isolation ward for erysipelas contracted smallpox by cross infection from him, and one more case has so far resulted outside the hospital, making three cases of smallpox so far directly traceable to the mistake of excusing E. G. from vaccination.

WM. L. HOLT, M.D.,
*City Health Officer.*

Little Rock, Ark., May 19, 1924.

# THE CONTROL OF RABIES IN CONNECTICUT

GEORGE E. CORWIN, D.V.S.

*Deputy Commissioner on Domestic Animals, Hartford, Connecticut*

Read before the New Haven County Public Health Association on March 6, 1924.

IN THE control of infectious diseases the most essential phase of the work is in properly managing the fomite. This may be accomplished, generally speaking, in one or more ways, namely, by quarantine methods, pre-vaccination, and sometimes post-vaccination treatment, or destruction. In the control of rabies either one or the other, and sometimes two of the above mentioned methods, must be used, and as the dog is invariably the disseminator of rabies, any one or more of the methods of control mentioned can be readily put in operation or execution.

Before going further into the manner of handling outbreaks of rabies, it might be well to consider briefly its nature and characteristics. I will not fatigue you with any historical review of rabies, for its infectious nature and the results of inoculation with rabies virus have been well known since the time of Aristotle; but I must recall to your mind that the spontaneous development of this disease and the belief that it could be spontaneous in nature of development was long ago exploded. Rabies is a fatal, acute, infectious disease of all warm-blooded animals, usually transmitted through the bite or scratch of an affected dog's teeth, at which time is introduced the virus contained in the virulent saliva. While it is not absolutely necessary that the introduction or inoculation of the human with rabies virus must be through the medium of the bite of a rabid dog, yet it is the usual manner of transmission not only to the human family but to the canine family and other animals.

Due to the fact that the transmission of this disease from one dog to another, from the dog to other animals and to the human family, also the fact that all cases of rabies are invariably traced to the inoculation by or through the bite of a rabid dog, our entire attention is invited to preventing rabies in the dogs as a very possible means of controlling or eradicating the disease.

Outbreaks occur from time to time, due to the nature of the disease in dogs, which causes them to run wild, running long distances and attacking en route, thereby spreading the disease to remote parts. One uncontrolled case of rabies in the dog at the stage of the disease when he is furious or running will infect or inoculate at times a large number of animals or persons.

In controlling rabies another important feature must always be taken into consideration—the incubation period. If, like many other infectious diseases, there was an approximate period between the time of inoculation and the development of the syndromic manifestations, rabies could be easily controlled or perhaps eradicated by quarantine methods, if universally applied to all the canine and feline species. However, the so uncertain incubation period of rabies, the elapsing time being from twelve days to three months, but may be as long as one year, and the impracticability of a quarantine on all the susceptible animals, give it an aspect very different from most other infectious diseases.

Rabies exists or occurs in almost every part of the civilized world with the exception of Australia, which, I understand, is free from this disease, due to the strict quarantine which is rigidly maintained. Its prevalence is increasing, generally speaking, in all sections of the country, yet at this time there is not a known case of rabies in Connecticut, the last quarantined area being released from quarantine some three months ago, in which area there was widespread infection. The cause of this particular outbreak was a

dog imported into Connecticut, which developed rabies a short time after arrival and in his mad run covered several miles of territory and inoculated other dogs, cattle, and several persons. This particular outbreak was overcome by maintaining a long quarantine, killing exposed animals which were known to have been exposed, and the use of the Pasteur treatment.

In all outbreaks it is noted that as a rule one or more persons have been subjected to inoculation by having been bitten by the rabid dog, and this feature alone makes the subject of rabies control or eradication one of the most important features to be considered.

Unlike many other communicable diseases, it is not only a fatal malady to man and animal, but the vaccination against the development either before or immediately after inoculation is the most successful vaccination known and one of the oldest methods of immunization practiced. It is a disease that can be averted, even after exposure, by vaccination.

During the last outbreak, it is interesting to note the distances that a rabid dog travels, also the number of animals that it will attack in its mad run. In looking over the files I find that we have an authentic record showing these conditions in several instances, which the following table will illustrate:

TABLE

| Starting Point | Miles Traveled | No. of Known Dogs Bitten |
|---|---|---|
| Suffield | 15 | 27 |
| East Windsor | 7 | 12 |
| South Windsor | 10 | 7 |
| Vernon | 30 | 7 |
| Somers | 40 | 12 |
| Manchester | 18 | 9 |
| Old Lyme | 12 | 4 |
| Norwich | 15 | 15 |

The number of dogs bitten, as given in the above table, is the exact number known. However, it can be readily understood that an addition to these known bitten dogs may have been probable, and this is one of the reasons why the disease is hard to control. All of these known bitten dogs or animals were destroyed, unless vaccinated or had received the anti-rabies treatment within three days after having been bitten.

In the following table the number of cases of rabies reported in dogs known to be affected and confirmed by a laboratory diagnosis, is as follows:

| | |
|---|---|
| 1917 | 150 |
| 1918 | 110 |
| 1919 | 74 |
| 1920 | 10 |
| 1921 | 14 |
| 1922 | 32 |

I also wish to call your attention to the importance of the diagnosis of rabies in dogs and to some conditions which might hinder the diagnosis of the same. It is an established fact that in making the laboratory diagnosis the negri bodies are not found in the brain cells until the disease has been well established in the individual. This fact may not be generally understood. Animals exposed to the infection of rabies or suspected of having rabies should not be killed unless they show pathognomonic symptoms of the same, and should be held in quarantine and not destroyed until the more advanced stages of disease are presented, whereby a laboratory diagnosis would be rendered more possible. There is very little danger in waiting or in holding a suspicious animal, for if it does not show symptoms at the time and has rabies developing, it would only be a short while (from twenty-four to forty-eight hours) when the advanced signs would become present. The laboratory diagnosis is very important, and negri bodies are found in 90 per cent of cases of rabies where the animal has died or the disease has become well advanced. The finding of this body is considered positive evidence of the disease, but the failure to find any in some instances is not proof that rabies is not present.

## METHODS OF CONTROL AS USED IN THE PAST

Control of rabies in animals in Connecticut is entirely under the jurisdiction of the Commissioner on Domestic Ani-

mals, who has the power and authority to promulgate rules and regulations for confining or controlling dogs or other animals for the prevention of rabies.

The control of the Pasteur treatment for persons bitten in Connecticut is taken care of by the State Department of Public Health through its local health authorities, and a person so bitten is subjected to the Pasteur treatment as soon as possible, the expense of such treatment to be borne either by the township or state. We have no case on record, so far as I am able to find, where any person so bitten by a known rabid dog has refused the Pasteur treatment, and no person so bitten and having received the Pasteur treatment has succumbed to the disease.

As before mentioned, the only methods used to control and eradicate rabies from known infected areas was by the application and enforcement of quarantine regulations. The quarantine which has been applied necessitated the destruction and diagnosis of all suspected cases of rabies, and the destruction of all dogs known to have come in contact with a known rabid dog or bitten by a rabid dog, and all dogs in the area through which the rabid dog had run to be safely chained or confined upon the owner's premises. These quarantines were always rigidly enforced, and persons so breaking the provisions of the quarantine have been subjected to the jurisdiction of the court, as related to the breaking of quarantines.

So far, or in the past, these quarantine measures have in Connecticut proven sufficient to control and eradicate rabies to a certain extent. However, there may be instances where some infected dogs, after the lifting of the quarantine, may come down with or develop rabies and can cause infection to be spread. It is always necessary, in placing a quarantine on areas where rabies exists, to maintain this quarantine for a considerable length of time, so that in all instances the length of quarantine necessary to control rabies is not always popular with the public and causes great inconvenience to dogs; so that in our last serious outbreak of rabies in 1922, having had sufficient proof that dogs could be successfully immunized by rabies vaccine by one injection method, that we incorporated in our last order of quarantine a provision that if an animal had received antirabies vaccination, applied by registered veterinarian who furnished the Commissioner on Domestic Animals with certification thereof, it would not have to be destroyed, and that if a dog which had been bitten by a rabid dog had received within three days from the time of biting the first injection of the treatment known as the antirabies treatment or Pasteur treatment, such animal being held in quarantine until it was released in writing by the Commissioner on Domestic Animals or his agent, would not have to be destroyed. In all previous quarantines these provisions had not been used.

### METHODS ADOPTED FOR THE IDENTIFICATION OF VACCINATED DOGS

The Department of Commissioner on Domestic Animals in Connecticut furnishes to veterinarians, for cost, certain tags, the cost of which has been about ten cents. On this tag it states or is inscribed "Vaccinated," also inscribed is the date on which immunity is supposed to expire. Forms are furnished to veterinarians which are in triplicate. One part is sent to the Commissioner on Domestic Animals, one to the dog warden of the town, and one is retained by the veterinarian for future reference. On these forms he reports the name of the owner, the licensed tag number of the dog, breed of dog, the date of vaccination, name of manufacturer of product, and certifies that he has vaccinated the said dog. These records are kept on file for future reference, or in case a question on vaccination occurs.

### VACCINE AND VACCINATION

In an outbreak which occurred in the fall of 1922, at which time it seemed that the disease might possibly become epi-

demic in Connecticut and that certain quarantine regulations would become more or less general in the whole state, it seemed as though having become acquainted with the results of the single treatment vaccination of dogs against rabies, that if the public could become acquainted with this form of protection it would help greatly in handling not only this epidemic but future ones, also would do away with the unpleasant features of a quarantine; so at this time, and for the first time, vaccination was recommended by the State of Connecticut as a proper means of protection. Connecticut was the first state to recommend antirabies vaccination of dogs as a matter of protection and immunity against rabies. This was not an experiment with the State of Connecticut, but was based upon conclusive evidence and data indicating that with such methods the menace of rabies could be eliminated.

Most of our evidence was based upon experiments which were carried out in Japan. In Japan there was a tremendous spread of rabies, and the Japanese government felt obliged to adopt some means whereby the ravages of this disease might be checked, and have proved through the application experimentally that it was possible to confer upon animals with this single injection method a sufficient immunity which would protect them for at least one year against any bites to which they might be exposed by rabid dogs. The method consisted in the single injection of a large dose of phenolized fixed virus. Since that time, up to 1921, 31,303 dogs were vaccinated, with the result that only one animal died from accidental causes following vaccination and in only one case did the vaccination fail in producing a sufficient immunity against exposure. On the other hand, the disease continued to rage among the unvaccinated animals. The vaccination of these two prefectures resulted in a 75 per cent reduction in the number of cases of rabies, the disease occurring only in the dogs which were not immunized.

Many investigators have aimed to develop a means of protecting dogs from becoming infected by natural exposure with some form of protecting vaccination. It has been proven through the application experimentally that the effective vaccination of dogs is practical, and it is possible to confer upon animals with a single injection an immunity which will protect them for at least one year. Many authorities believe that the immunity thus afforded will last for a much longer period, and steps are now being taken in an effort to establish a period or length of immunity thus afforded. Japanese authorities claim this form of vaccination is preventive for two years. This they base upon an experiment carried out in two provinces where rabies was steadily on the increase. In province number one 30,000 dogs were vaccinated, with a loss of only two dogs from rabies, while in province number two out of 10,000 unvaccinated dogs 250 died with rabies within a year.

Vaccination is being rapidly pushed throughout the empire with the expectation of eradicating rabies from the country. American producers of single treatment antirabies vaccine do not claim more than one year's immunity after vaccination with their product. Possibly after longer experimentation they may find that it does cover a more extended period.

At this time we have a record of 1,600 dogs having been vaccinated in Connecticut, and the result of this vaccination of dogs against rabies in Connecticut has been satisfactory, and I am of the opinion that if another serious outbreak occurs that the antirabies vaccination of dogs will be readily adopted by the dog owners.

Since the vaccination of dogs was started in Connecticut six vaccinated dogs have been bitten by known rabid dogs and none have developed rabies. An interesting incident occurred when a known rabid dog bit two unvaccinated dogs and one vaccinated dog. The two unvacci-

nated dogs developed rabies and the vaccinated dog did not and is still living after the lapse of nearly two years. We are absolutely sure in Connecticut that the very best means to eradicate and control rabies is by the antirabies vaccination method.

It has been thought that at some time it might be considered advisable to make the vaccination of dogs compulsory, and perhaps at some future time the question of such a necessity might be brought up for action. However, we have thought that perhaps it might be better at this time, and as an educational affair, to give the owners choice of holding animals in strict quarantine (as the quarantine might call for) or in having their dogs vaccinated, which would give them the same liberties as dogs have in unquarantined areas. We have tried to bring these facts before the laity and to educate them relative to the results of antirabies vaccination.

The maximum immunity established following vaccination is considered to be attained in about three weeks. However, sufficient immunity is established in ten days following vaccination to withstand the injection of a fatal does of the street virus. The chief method used in the production of canine rabies prophylactic vaccine is as follows:

Canine rabies vaccine, the one injection method, is a product introduced in America in August, 1921, based upon the extensive researches of Dr. Eichhorn and Dr. Lyon following the investigations in Japan. In preparing the vaccine, rabbits are inoculated intradurally with the fixed virus. Rabbits come down with rabies regularly from seven to nine days. The brain and spinal cord are then removed and this tissue is then emulsified in a 66–3/2 glycerine saline solution in a proportion in one part of brain to four of the solution. The equivalent of one-half of 1 per cent phenol is added. This vaccine emulsified is then permitted to remain at room temperature for a period of ten days or at ice-box temperature for a period of thirty days, to permit of the attenuation of the virus by the action of the phenol. After the lapse of this period at room temperature, or at ice-box temperature, the vaccine is then ready for distribution and application.

In concluding, I wish to say that the importance of eradicating rabies cannot be overestimated. The evidence at hand and the assurance that antirabies vaccination by a single treatment will immunize and protect an animal for a period of at least one year, should appeal not only to the owners but to the public officials.

I also wish to call your attention to the advantages of the single treatment vaccination. First, the vaccination of the animal by the single treatment is a very simple matter. The subcutaneous injection of a very small quantity is sufficient—from 1 to 5 c.c., according to size and weight. No ill effects follow the injection of antirabies vaccine except in very exceptional cases, or perhaps where an animal might be hypersensitive. Nominal cost makes it popular. Other advantages are: protection of the animal against street infection, protection to the owner and the human family, and absolute control and finally eradication of rabies in dogs.

There are very few diseases of so deadly a nature to all warm-blooded animals that can be as satisfactorily controlled or eradicated by so simple a method or of eliminating it in a single host. I am satisfied that if all dogs could be vaccinated for a period of two years that rabies would cease to exist.

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# RATIO EXISTING BETWEEN LOSS ON IGNITION AND OXYGEN CONSUMED FOR INDUSTRIAL WASTES AND SEWAGE

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IN STREAM pollution work the chemist is frequently called upon to ascertain, among other determinations, the amount of organic matter present in a given sewage, trade waste, or effluent.

There are various methods of getting this information, but one of the simplest, if interpretation into satisfactory units can be made, is the oxygen consumed determination, meaning, as carried out in the laboratory, the amount of oxygen by weight, expressed in parts per million, consumed when the waste is oxidized by potassium permanganate in acid solution at or near the boiling point of water for a period of usually thirty minutes. The determination has no exact value as to the amount of organic matter, for we cannot calculate the organic matter unless we know just what compound we are oxidizing. In the case of the organic compound oxalic acid this oxygen consumed is so regular and constant that the amount of this substance can be calculated very accurately. Another very satisfactory method for determining the amount of organic matter and the method used in many places is the amount of loss on ignition of the solids from a known volume of the waste. This is determined, as the term implies, by igniting at a low red heat and weighing the residue, which, when subtracted from the total solids, gives a result which very closely corresponds to the amount of organic matter. The ratio between loss on ignition and oxygen consumed for oxalic acid is 7.875 to 1.0. The loss on ignition gives an exact value when the substance burned contains no ash. When there is ash produced, as in the ignition of practically all animal and vegetable matter as such, there is a small error, practically negligible when the rapid changes in composition and flowage are considered.

It was thought that data showing the ratio existing between the loss on ignition and the oxygen consumed for various wastes might be of value in computing organic matter from oxygen consumed values, especially since there is found a noticeable variation in this ratio with the different wastes. In addition to this use the two determinations made on the same specimen of waste serves as a check on the analysis. The value of this phase was made evident when the author was confronted with the suggestion that a certain oxygen consumed value was entirely too high for the condition of an effluent from a certain cannery and therefore possibly there was an error in the placing of the decimal point. Upon inspection of the ratios between the loss on ignition and the oxygen consumed of the raw waste and the effluent showed them to be 1.53 to 1.0 and 2.28 to 1.0, respectively; or if the ratio of the raw waste were considered correct, the oxygen consumed on the effluent should have been higher instead of lower, considering the treatment to have affected each class of the raw waste equally, which probably was not the case. Oxygen consumed was again determined on a different sample of this effluent after the sample had stood some time, and this result showed only 5 per cent variation from the first determination.

Following are the ratios which have been obtained in this laboratory on the wastes indicated. The oxygen consumed and loss on ignition were done in accordance with the methods outlined in the Standard Methods of Water Analysis of the American Public Health Association, 1920, using the oxalate method and thirty

| | | P. P. M. Loss on Ignition | P. P. M. Oxygen Consumed | Ratio |
|---|---|---|---|---|
| **INDUSTRIAL WASTES.** | | | | |
| Beet Sugar Wastes | Packing Plant Waste | 1376. | 550. | 2.5 to 1.0 |
| | Lime Sludge Effluent | 23202. | 8200. | 2.96 : 1.0 |
| | Press Liquor | 2932. | 1750. | 1.67 : 1.0 |
| | Diffusion Cell Liquor | 4250. | 2010. | 2.1 : 1.0 |
| | Steffen House Liquor | 15194. | 7210. | 2.1 : 1.0 |
| | Plume Water | 692. | 420. | 1.65 : 1.0 |
| | Mixed Wastes | 7860. | 2270. | 3.4 : 1.0 |
| | Effluent (Mixed Wastes) | 1192. | 430. | 2.8 : 1.0 |
| Condensery Wastes | Can Washings | 186. | 46. | 4.0 : 1.0 |
| | Vacuum Pan Discharge | 586. | 244. | 2.4 : 1.0 |
| | Tank Washings | 15644. | 5460. | 2.8 : 1.0 |
| | Mixed Wastes | 1076. | 430. | 2.5 : 1.0 |
| Pea Canning Wastes | Plant No. 1. Straight Run Raw Waste | 4778. | 2210. | 2.2 : 1.0 |
| | Plant No. 1. Straight Run Effluent | 4080. | 2220. | 1.8 : 1.0 |
| | Plant No. 1. Clean Up Raw Waste | 1480. | 580. | 2.6 : 1.0 |
| | Plant No. 2. Full Run Raw Waste | 3648. | 1600. | 2.3 : 1.0 |
| | Plant No. 2. Full Run Effluent | 3130. | 1470. | 2.1 : 1.0 |
| | Plant No. 2. Clean Up Effluent | 1196. | 400. | 3.0 : 1.0 |
| | Plant No. 3. Straight Run Raw Waste | 3824. | 2340. | 1.6 : 1.0 |
| | Plant No. 3. Straight Run Effluent | 1258. | 600. | 2.1 : 1.0 |
| | Plant No. 3. Clean Up Raw Waste | 12364. | 5800. | 2.1 : 1.0 |
| Paper Mill Wastes | Water from Blow Pit | 4856. | 3720. | 1.3 : 1.0 |
| | White Water Waste | 368. | 110. | 3.3 : 1.0 |
| Corn Canning Wastes | Raw Waste | 5520. | 2950. | 1.8 : 1.0 |
| | Effluent After Treatment | 658. | 288. | 2.3 : 1.0 |
| Steel Tube Co. Waste | Raw Waste | 626. | 52. | 12.0 : 1.0 |
| | Effluent After Treatment | 508. | 43. | 12.0 : 1.0 |
| **DOMESTIC SEWAGE.** | | | | |
| Plant No. 1. Run No. 1 | Raw Sewage | 460. | 110. | 4.2 : 1.0 |
| | Effluent Sedimentation Tanks | 340. | 90. | 3.8 : 1.0 |
| | Effluent Colloidal Tanks | 310. | 65. | 4.8 : 1.0 |
| | Effluent Contact Beds | 308. | 60. | 5.1 : 1.0 |
| | Effluent Sprinkling Filters | 260. | 46. | 5.7 : 1.0 |
| Plant No. 1 Run No. 2 | Raw Sewage | 500. | 99. | 5.0 : 1.0 |
| | Effluent Sedimentation Tanks | 348. | 78. | 4.5 : 1.0 |
| | Effluent Colloidal Tanks | 308. | 58. | 5.3 : 1.0 |
| | Effluent Contact Beds | 224. | 52. | 4.3 : 1.0 |
| | Effluent Sprinkling Filters | 300. | 52. | 5.9 : 1.0 |
| Plant No. 2 | Raw Sewage | 496. | 290. | 1.7 : 1.0 |
| | Effluent Sedimentation Tanks | 360. | 160. | 2.25 : 1.0 |
| | Effluent Sprinkling Filters | 256. | 115. | 2.2 : 1.0 |
| Plant No. 3 | Raw Sewage | 376. | 154. | 2.4 : 1.0 |
| | Effluent Sedimentation Tanks | 400. | 125. | 3.2 : 1.0 |

minutes' heating for the former and a second platinum dish to provide the recommended air space for the latter.

## DISCUSSION

It will be seen that the ratios between loss on ignition and oxygen consumed range between 3.4 to 1.0 to 1.3 to 1.0, with a general average at the ratio of 2.25 to 1.0 for the organic vegetable wastes, with the largest number of identical values at the ratio point 2.1 to 1.0. The average for the condensery wastes gives the value for this ratio of 2.9 to 1.0, while the average for the domestic sewage wastes of both run No. 1 and No. 2 of plant No. 1 gives the value of 4.86 to 1.0 for the ratio. This plant handles about 10 per cent of its volume of sewage, a waste from a packing plant which shows a ratio of 2.5 to 1.0, which may mean that the above ratio of 4.86 to 1.0 is a trifle low for plain domestic sewage. In plant No. 2 and No. 3 there is known to be discharged a large amount of cooling water and storm water, and therefore the ratio may not mean much. In these latter two plants creamery and condensery wastes, respectively, are also known to constitute a larger portion of the total sewage. This is evidenced further by the milky character of these wastes. Lastly, attention is called to the extremely high ratio found in nonorganic waste, that represented here by the waste from a steel tube company showing a ratio of 12.0 to 1.0.

The ratios cited above are just what would be expected from the organic character of these various types of wastes. The vegetable wastes, being high in carbonaceous matter, would be expected to show a high oxygen consumed, while the domestic sewage, being somewhat higher in nitrogenous organic matter and lower in carbonaceous organic matter, would be expected to give a lower oxygen consumed. These two points are brought out by the above ratios. The lack of organic matter in the tube waste is still in accordance with its very high ratio.

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# THE VALUE OF EPIDEMICS IN PUBLIC HEALTH EDUCATION

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PUBLIC health protection is a matter of building individual health-protective units and of coördinating these units to serve as a barrier against those things which tend to shorten the span of human life.

Up to the present time efforts in this direction have resulted in the adoption of adequate measures for health protection in a great majority of the larger cities of the United States. In these cities the health department has taken its rightful place among the important municipal functions.

Particular stress is now being laid upon building or strengthening the health units of smaller cities and rural areas. The most important measure for creating adequate health units in these communities is public education in regard to the benefits of health protection. Such education tends to result in a public demand for, and the creation of, an efficient public health unit.

Ordinarily, education of the public is a slow process. The means adopted have included almost every educational method, from pamphlets to large-scale object lessons or demonstrations. The outstanding method has been the demonstration which, as its name implies, demonstrates the work and results of an adequate health unit. Carried on in some average community, usually under the direction of a voluntary health organization, it serves as an object lesson to other communities. Its success is dependent upon, first, the taking over of the voluntary health organization's functions by the community in which the demonstration is being carried on, and second, the number of other communities which develop health units as a result of the demonstration.

It is not the object here to attempt any enumeration of the results which have followed the demonstration method of public health education. It is rather the purpose to point out another method of obtaining the same final result, that of crystallizing public sentiment to accomplish the formation of an efficient health unit.

An epidemic has its good points. It is concrete evidence, apparent to the most obtuse, of the need for public health protection. The specific public reaction to an outbreak of communicable disease is an indefinite dissatisfaction, which might be termed the incubative or receptive stage for public health education. Ordinary methods of education usually require years for the same effect which an epidemic produces in weeks. Why not take advantage of the contribution to public health education which is made by disease itself?

## HOW THIS CONTRIBUTION WAS UTILIZED IN THE ORGANIZATION OF THE SAN JOAQUIN LOCAL HEALTH DISTRICT

Let us consider some of the means and results of the advantage thus taken. The San Joaquin Local Health District of

California had its inception following an outbreak of diphtheria. The stronghold of the disease was in and around Lodi, a city of 5,000 inhabitants. Through a lack of proper facilities for controlling the epidemic, the entire population of the county was, more or less, affected. The epidemic abated in March, 1922, and the Rotary Club of Lodi proposed that either more efficient measures of protection be inaugurated in their community or that some coöperative county plan, preferably the latter, be adopted.

San Joaquin County, population 85,000, includes four incorporated cities and twelve unincorporated towns and centers. Each city and the rural area maintained a health unit, making a total of five. Except for the health department of Stockton, the county seat, the personnel of the health units were on a part-time basis. Previous to 1922 some attempts had been made to consolidate the health work, particularly that of Stockton and the rural area. All these attempts failed, due to the lack of public interest and coöperation.

The Lodi Rotary Club, following its resolution, sent speakers to every other club in the county, to the farm bureau centers, to the governing bodies of the cities, and to the County Board of Supervisors. The speakers stressed the need for health protection and for the appointment of a committee to consider a plan for a coöperative health unit.

The wave of favorable publicity and public opinion might be likened to the spread of a prairie fire from a spark. A committee of five was appointed, one member by the governing body of each city and one by the Board of Supervisors. The committee, consisting of two medical and three lay members, first met soon after its appointment and took up the consideration of several coöperative plans. At the completion of its work the committee recommended the formation of a health district, as provided by the statutes of California, 1917.

The extent to which the public must coöperate in the formation of a health district in California is shown by the following legal requirements:

1. A petition, from each unit in the proposed district must be presented to the county board of supervisors, signed by registered voters in the unit, equal in number to 10 per cent of the votes cast for governor at the last election.

2. If an incorporated city is included, the governing body of the city must pass a resolution requesting that the city be included in the proposed district.

3. The board of supervisors, after posting the petitions for 30 days, holds a hearing and makes the final decision as to whether public welfare requires the formation of a health district.

Without public coöperation any one of the above requirements would serve to act as a huge obstacle to the adoption of the health district plan. This is further emphasized by the fact that the adoption of such a plan removes the jurisdiction of health work from the various elective governing bodies to an appointive board of trustees.

In the face of public demand and cooperation, however, all such obstacles became of negative importance. The required resolutions were passed by the city councils, the petitions were successfully circulated by members of the various clubs and the farm bureau, the Board of Supervisors on December 11, 1922, gave their unanimous approval, and the San Joaquin Local Health District began to function on March 1, 1923.

We have seen here three factors working toward a natural equation: first, the epidemic, acting as concrete evidence of the need for health protection; second, a receptive public, as the result of the epidemic; third, a directive force, the Rotary Club, to turn the flow of public opinion into the channel of public health organization. The natural equation, in this case, was a coöperative health unit.

In the Southern States the growth of full-time county health units, as a result of the campaign of the International Health Board to eradicate hookworm in-

fection, has been one of the outstanding public health accomplishments of recent years. It might well be said that hookworm eradication was only incidental to the more important and lasting benefits of full-time county health units. A dissection of this growth shows the three factors already mentioned: first, concrete evidence, the hookworm infection; second, receptive public; third, directive force, the International Health Board.

It is not intended to imply that the growth of these county health units in the South was accomplished over night. The educational effect of such diseases as hookworm, malaria, or tuberculosis is far less potent than that of diphtheria, scarlet fever, or smallpox. In the former group of diseases the factor of "receptive public" must be built up through education based upon the concrete evidence of the disease. In the latter group, the disease itself, by its acute character, produces the receptive public.

This public reaction to an epidemic is strongest in those communities where health protection is most needed, the small city or rural area. In the larger cities a few cases of diphtheria or scarlet fever excite no particular public interest or comment. In the small city or rural area a few such cases are known to almost every resident and furnish an important topic for discussion. Almost daily we read, in the papers of the large city, news of an epidemic occurring in some neighboring small city, town, or county. Such news is deemed important enough for the out-of-town correspondent to transmit. If we would only read between the lines the story would tell of that city, town, or county being in a receptive mood for health protection, just as the man who has suffered slight fire damage to his property is in a receptive mood for fire protection.

The lack of the vital component needed to produce an adequate health unit, as the result of an epidemic, may best be shown as follows:

1. Concrete Evidence + Receptive Public + Directive Force = Health Organization by Public Demand.

2. Concrete Evidence + Receptive Public are the products of every epidemic.

3. Health Organization by Public Demand does not often follow; therefore it is evident that the vital component,

4. Directive Force, is lacking.

Who can best supply this directive force, following an epidemic? In the South it has been supplied by the International Health Board. It can be supplied by any voluntary or state health organization. Only slight impetus is necessary to turn the force of public opinion in the proper direction. A visit and a few days' residence in the community by a representative of the state or voluntary health organization would suffice. His advice and counsel would be sought for and followed.

It has been the purpose to show that an epidemic may mean more than a rise in the incidence and death rate of a disease. Statisticians have predicted an increase in incidence and virulence of smallpox. So far this prediction has only resulted in a vision of impetus given to vaccination and of confusion in the ranks of those cults opposed to vaccination. Such confusion, while pleasant to contemplate, will produce no great advance in public health education. If, however, each outbreak of smallpox serves to confuse the cults and at the same time brings about the formation of an adequate health unit, then will the epidemic and confusion have produced lasting rather than transitory results.

The possibilities of balancing a rise in disease incidence and death rate with a full-time health unit are large. "Following up" an epidemic is a short cut to such a unit, and in the warfare against disease, which is like any other war, the principle of taking advantage of short cuts and hitting hard in many places will result in speedier victory.

# EDITORIAL SECTION

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## FOOT-AND-MOUTH DISEASE

Although a disease of cattle, rarely transmitted to man, this malady is of much interest not only scientifically, but because of the enormous losses it causes to cattle interests. During the past year it has cost England approximately fifteen million dollars. In this country the outbreak in California is fresh in our minds, but the cost in dollars has not yet been computed. The inconvenience and suffering of cross-country tourists through quarantine have been widely published.

The announcement of the discovery and cultivation of the germ, which has for years eluded the most painstaking researches of experts, will be received everywhere with satisfaction, carrying as it does the probability of a preventive vaccine in the near future. The organism is a minute bacillus, ovoid in shape and occurring in twos. The smaller forms are only 0.1 $\mu$ in length. Cultures have been maintained for ten months—approximately twenty-five generations—and still retain some degree of virulence. The disease has been reproduced from cultures, and the organism recovered from the inoculation disease. After recovery inoculated animals were found to be immune to fresh and fully virulent fluid from vesicles. It was further shown that the virulence of the germ was attenuated by culture, and increased by passage through animals.

The discovery has been made possible by the Köhler apparatus constructed by Zeiss, which has already revealed the causative agent of contagious pleuropneumonia.

It is a matter of regret that the German Ministry of Agriculture has not yet given permission to Frosch and Dahmen, the discoverers of the organism, to announce in full the details of their work. It can be said that liquid media—serum, plasma, blood, and sugars—were found unsuitable and that success was achieved with certain solid media of secret composition, but which apparently had the customary bases of agar and gelatin.

# NEW OBSERVATIONS ON THE MALARIAL PARASITE

We have previously called attention to the treatment of general paralysis by infection with the malarial parasite.[1] The method has passed the experimental stage and seems to have been established on a firm basis, through the remarkably good results obtained. Incidentally, it has led to most instructive studies of the malarial parasite, which have added a great deal to our knowledge of its natural history. Designed for the guidance of those wishing to treat general paralysis, the work has opened new fields of general interest which the public health worker will welcome.

For the practitioner it is enough to say that of 84 paretics kept under observation long enough for the formation of a sound judgment, 14 died within a short time of the completion of the treatment; in 20 there was no noticeable change either mentally or physically, though in the ordinary course of events a number of these would have died before the report was made; in 17 there was marked improvement both physical and mental; in 10 there was definite physical improvement, without change in the mental state; while in 23 the improvement has been so great that all are fit for discharge from mental hospitals, and a number of them have been able to resume their former occupations. The improvement has persisted a year in some cases. Since past experience has indicated that the maximum of improvement does not manifest itself at once, it is hoped that in time even a better report can be made on these 84 cases.

The parasite of benign tertian fever, P. vivax, is best suited for treatment. The quartan parasite, P. malariae, gave an irregular and prolonged incubation period—forty-four days in one case. The estivo-autumnal parasite, P. falciparum, was used in one case only, the result being a fulminating malignant case terminating fatally.

Contrary to the opinion still expressed by some authors, three species of the malarial parasite exist, which reproduce themselves and remain true to type, causing the same form of infection over and over again. Immunity against one species does not confer protection against the others. Unlike some other parasites belonging to the animal kingdom, such as certain trypanosomes, the malarial organism does not change in morphology or virulence after prolonged passage from man to man, observations after twenty-three direct passages without the intervention of the insect host showing no change in type of infection, temperature, or clinical picture.

Apparently we will have to revise some of our ideas concerning the action of quinine on the malarial parasite. Inoculation malaria is unusually susceptible to the action of quinine, doses of thirty grains daily for three days sufficing to rid the patient of parasites. The explanation of this remarkable sensitiveness of the inoculation strain to quinine is not clear, but appears to lie in the fact that the infection is primary, and not, as so often seen in practice, of long standing. Further, it was shown that the administration of quinine before infection was useless. It must be continued for at least ten days after the infecting feed to prevent development. From these observations the conclusion was drawn that quinine has little or no effect on sporozoites, and that the mechanism by which the development of infection is prevented is essentially the same as that by which cure is effected.

Why is quinine sometimes effective and sometimes not? Probably quinine by itself never cures malaria. Quinine destroys many parasites in the blood and

1. AMERICAN JOURNAL PUBLIC HEALTH, XIII, No. 8.

antigen is set free. This antigen stimulates the formation of antibodies, which in turn destroy the remaining parasites. It has long been known that quinine acts best when the blood contains many parasites. There is considerable evidence that the essential factor in the cure of malarial infection is the capacity of the host to produce immune bodies in response to the antigen resulting from the destruction of the parasites by some medicament. When the immune body is insufficient to destroy those parasites which have escaped the quinine, the surviving organisms acquire a resistance to the antibodies. In this way resistant relapse strains are developed.

The paper[2] from which we have drawn so largely must be read to be appreciated. Whether or not all the conclusions will be confirmed by future work only time can tell. There is, however, food for thought and suggestions for research in this unusually interesting report.

2. Certain Observations on Malaria Made During Treatment of General Paralysis, Lancet, May 17, 1924, p. 1017.

## PASTEURIZATION OF MILK

Human nature seems prone to forget. This truth has been illustrated in many ways, notably by the failure to vaccinate against smallpox when there is no immediate menace of the disease. Another striking example is the controversy which seems to have broken out anew over the danger to human beings from bovine tuberculosis.

More than twenty years ago this question was brought to the front in an acute way by Robert Koch at the London Congress on Tuberculosis, who then belittled the danger to human beings from the animal disease. He was answered at the Congress by work done at the State Live Stock Sanitary Board of Pennsylvania, and by the citations of undoubted cases of human tuberculosis contracted from animal sources. However, both the British and German governments appointed commissions to study the question, in addition to which a vast amount of work was done by individuals in private, state and municipal laboratories, all of which proved beyond question that bovine tuberculosis was transmissible to man, and that this source of infection caused no insignificant proportion of the cases of tuberculosis, especially in those below sixteen years of age. Even the German Imperial Commission could not support the position taken by Koch, and showed that of eighty-four cases of children, twenty-one, or exactly 25 per cent. had derived their infection from bovine sources. In this country the work done at the laboratories of the State Live Stock Sanitary Board of Pennsylvania, at our Bureau of Animal Industry in Washington, and at the city laboratory in New York stands preëminent. As time has gone on, each year has brought work from different sources confirming the results already obtained. It is not too much to say that there is no scientific man of any standing in any part of the world to-day who questions the transmissibility of bovine tuberculosis to human beings. Children are especially susceptible to the disease, and as a rule the younger the child the greater is its susceptibility.

There is still some difference of opinion as to the actual danger—that is, the proportion of children who are actually infected by the bovine germ—but that it does occur is doubted by no one. In New York City, Dr. Park estimated that 300 children died each year from bovine infection, and there is no reason to believe that New York is worse in this respect than other large cities of our country.

The public seems to have forgotten its lesson, merely because the question is a settled one and because there has not been as active proclamation of this menace to health as there was when work was being done actively. From every part of the country requests have come to the writer within the past few months for facts concerning the danger of milk from tuberculous cattle. In some places hearings are being held on the protests of milk producers against the laws passed for the protection of human health, and from the large number of points from which requests for information have come—extending from the Canadian border on the north to Arkansas on the south, and from the Atlantic to the Pacific coast—one might be led to suspect that some propaganda was being carried on to lower the bars against tuberculous milch cows, in spite of the fact that even from the economic standpoint tuberculosis in cattle is a scourge to our stock raisers, irrespective of its influence on human health.

The discovery of vitamins and the alleged injurious effect of heat on these accessory food substances has given another point for argument to the objectors, and the danger of scurvy from heated milk is being used as an argument against the pasteurization of milk. The growth promoting vitamin is not affected by ordinary pasteurization, and there is much difference of opinion on the effect which pasteurization has in lessening the antiscorbutic factor. There are instances which cannot be doubted of what might be called epidemics of subacute infantile scurvy in children fed on pasteurized milk, but there are also instances of children nursing at their mother's breast who suffered from scurvy. It is also to be borne in mind that at best cow's milk is classed amongst those food stuffs which have a low anti-scorbutic value, and there are outbreaks recorded by reliable authorities of wide-spread scurvy occurring in children who had for at least six months prior to the outbreak taken one pint of fresh milk per day, but whose diet otherwise was deficient in fresh meat and vegetables. Recent work in England and in this country has shown that the essential factor in destruction of vitamin C is oxidation and not heat. At any rate, the prevention of scurvy by orange juice, tomatoes, or the juice of raw swedes is so cheap, and easy and so sure in action, that the certain risk of tuberculosis or diarrheal diseases from unpasteurized milk cannot be balanced against the possible danger of scurvy through heated milk. At the Lister Institute[1] Dr. Zilva has succeeded in separating and concentrating the anti-scorbutic factor of lemon juice to such an extent that it is now possible to reduce the total solids from about 9 per cent to about 0.04 per cent without appreciably diminishing the antiscorbutic activity. It is now possible to store concentrated antiscorbutic preparations for considerable periods without any loss in potency. The most recent publication on the matter[2] gives exactly the same vitamin content for pasteurized milk as for fresh cow's milk in summer. It must be borne in mind, as is pointed out in this same publication, that cow's milk in winter may be low in vitamin A, and very low in vitamin C, and it is well known that cows may be fed on a diet which seems perfectly satisfactory to them, and which maintains their health, yet produces milk which is practically free from vitamin A.

It is evident that any argument based on the danger of the destruction of vitamin C by pasteurization is fallacious, and cannot be maintained.

Tuberculosis of cattle is so widespread, and the number of cattle so great,

1. Annual Report, 1924.
2. Report on the Present State of Knowledge of Accessory Food Factors (Vitamins). Second Edition. Medical Research Council. H. M. Stationery Office, 1924.

that it seems Utopian to look forward to the eradication of the disease in milch cows, except perhaps in those animals producing certified milk, or in certain special dairies. In the meantime the only possible safeguard is pasteurization. We have no hesitancy in saying that pasteurization should be recommended by all physicians and health officers. The American Milk Commission by an informal vote has recommended even the pasteurization of certified milk. The study made by the New York City Board of Health on children fed at the fifty-five municipal milk stations in that city demonstrated the tremendous value of pasteurization in combating diarrheal diseases of infants, and showed also that these children gained weight regularly. It has also been demonstrated that pasteurization kills the tubercle bacillus and makes a milk which would otherwise be dangerous a safe food for infants and children.

Pasteurization[3] should be carried out by the holding method, and the milk maintained at a temperature of 145 degrees F. for thirty minutes.

3. Report of the Committee on Milk Supply of the Sanitary Engineering Section, American Public Health Association, 1920.

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# ASSOCIATION NEWS

## LIST OF MEMBERS

Proposed for election to the A. P. H. A. May 28 to June 30, inclusive
Names of New Members are set in Light Face Type.
Names of Sponsors are set in **Bold Face** Type.

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# COME TO DETROIT IN OCTOBER

*If you would see a beautiful peninsula, look about you*—thus runs the time-honored motto of the State of Michigan.

In truth, it is a beautiful peninsula. It has its coasts swept by Lakes St. Clair, Erie, Huron, Superior, and Michigan. It has its fast-moving river at the Straits, where canals have been built to afford boat traffic; its tranquil flow of the St. Clair River that permits of summer homes and vast sweep of lawns to the water edge; its mighty Detroit River that carries food and fuel for millions in a steady procession of ships.

Then, dotting the entire peninsula, as the airplane eye sees them, are better than 5,000 lakes of fishable size; some of them stand in the far northern portions, almost untouched by resorters; others make happy week-ending spots for the gasping city folks.

There are the copper mines of the Upper Peninsula, the farm and fruit lands of the western coast, the mighty campuses of the Agricultural College, the University of Michigan, the smaller, daintier campuses of a host of other such institutions—and the other things that make up a state.

There are miles of paved roads that open up the far-away places; acres of second-growth timber covering the bare spots the early folk left in cutting vast incomes from the forest.

It is to Detroit that the members of the American Public Health Association are coming for convention October 20. This is your invitation from the convention city.

There is somewhat of a motor industry in Detroit. There is, in fact, the largest motor plant in the world in Detroit. It is the Ford Motor Company. Its boast is that it has produced a car in sixteen seconds—and several owners of those cars claim they bought it.

The statisticians claim that Detroit produces 65 per cent of the automobiles made in the world. You, as a convention attendant, will not have time to see them all produced, but you will be able to see a few of them turned out if you care to take the time. Those same statisticians also claim that the automobile industry is but 48 per cent of the city's industrial program. Detroit likewise makes stoves.

Some years ago, in the century just passed, an ambitious soul started a drug store. To-day there is the Parke-Davis Company, chip off that drug store block. The Parke-Davis Company combines with the Digestive Ferments Company and

HEADQUARTERS FOR DETROIT CONVENTION

DOWNTOWN DETROIT AT CITY HALL

others to make of Detroit a center for manufacture of biological products.

There are 272,789 school children in Detroit and they are released from bondage at 3 o'clock each afternoon. But fear not for your safety if they should rush en masse. There are eighty-six square miles to Detroit and thirty-one public parks in which the youngsters can hide. Likewise nearly every school has its own playground attached. They keep the children off the streets and out of some forms of juvenile mischief.

What else would you know? We have a nonpartisan administration in the city, a nine-man council, and a seven-man school board. We brag of a business administration—the Board of Health is as far removed from political influence as is feasible through a system of yearly appointments which changes one man on a board of four each year. The largest filtration plant in the world is operating to ensure the purity of our water supply. The Belle Isle bathing beach, in season, is chock full of those who seek a swim and those who get only a sunburn. Incidentally, Belle Isle is about the largest park of its kind in the discovered world.

The Detroit River does more than carry freight. The cheapest pleasure riding in the world is at everyone's disposal a block or two from the City Hall. Canada is ten cents across the water. The Dominion has a beverage law that differs in a great many respects—primarily alcoholic content on prescription—from the Volstead runner to the Eighteenth Amendment; which caused one visitor to remark from the middle of the river: "Behind, Detroit's water line—ahead, a line but little water."

If you must come down with a contagious disease you would find Herman Kiefer Hospital, conducted by the Department of Health, an admirable institution with a cost to the taxpayer of about $2.30 per bed per day. You would find

little company in Herman Kiefer, however, especially in that section devoted to smallpox. Between smallpox itself and vaccination, in the past few months Detroiters have become almost immune to the disease.

There is the Leland School for Crippled Children and the Day School for the Deaf. There is no reason in attempting to describe these nor to urge a visit to them. It takes a grown man devoid of even the semblance of sentiment to watch these handicapped youngsters battling their way to some form of useful existence—battling always with a smile that shames their more fortunate brothers in their worries and trifling tears—without getting that choky feeling in the region of the larynx.

Let Mrs. Van Adestine show you how it's done with three of her pupils in line. The one who has never heard and has never spoken and who answers back in the sound-proof room only the semblance of the sounds that are hurled in shouts against her ear drums; the one who is just beginning to know and who smiles back at you as you note her success; the one who stands some feet off and listens hard for the word, then tries to speak it and looks searchingly at you to see if she has done it right—then laughs in her seven-year-old fashion as she knows she is coming on—coming on to something she doesn't quite know what.

There are the children basking naked in the sunlight on the porches of the children's unit of the Detroit Municipal Tuberculosis Sanatorium at Northville, which is a section of the Tuberculosis Sanatorium conducted by the Department of Health. They laugh, too, as the sun browns their bodies and the free air builds them up to get along with better than the half chance they had in a darkened city room.

You look, rather, for curious things? Then see Greek Town and Italian Town and China Town and Armenian Town. If America is the melting pot of the world, then Detroit holds the center of the pot.

You can stroll out Monroe Avenue in the evening and watch the Greeks at play, sitting about the coffee shops with their nonunderstandable card games or laughing along the sidewalks. Their day begins when sensible folks think of going to bed. They laugh half the night through and then catch a wink of sleep before going back to their shoe stands.

There are things about any city which statistical fiends cannot note for your quick inspection.

Detroit was once but a city beautiful. Jefferson and Woodward avenues were streets of homes which to-day bear witness to the added feature of Detroit's advertisement—*the beautiful and dynamic.*

Its industry chokes its arteries of traffic; each corner turned but produces its evidence of throbbing engines and turning lathes. Still, farther out, one can find the tree-lined avenues of homes. Detroit

FORD MOTOR COMPANY

is still the city beautiful, but one has to look for the beauty instead of having it thrust into his very face.

No quick turn about the hotel lobby will tell Detroit's story to those of you who purpose coming here in October. Nor can any guide show you. In the quiet hours, when far lights against the sky are the only testimony of a seething twenty-four-hour industry, the seeking one can hear the mystery call—can find the inner beauty of an organized community.

The Department of Health is host.

The City of Detroit is the reception room.

The convention begins on October 20.

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## THE FORUM COMMITTEE

### QUESTIONS AND ANSWERS

**Subject: Foot and Mouth Disease.**

[*The Forum Committee makes its grateful acknowledgment for helpful assistance and advice in answering the following questions to the Bureau of Animal Industry of the United States Department of Agriculture, and to the United States Public Health Service.*]

Q. Is a state justified in declaring a quarantine on low growing vegetables, such as rhubarb, celery, lettuce, and asparagus, grown in a neighboring state in which there has occurred an outbreak of foot and mouth disease of cattle? Also

What is the danger of transmission by interstate shipment of milk?

A. These questions relate to interstate quarantine, which is a problem of the federal government and which is handled by two of its departments, that of Agriculture through its Bureau of Animal Industry, and that of the Treasury through the United States Public Health Service. The two questions were submitted to both the Bureau of Animal Industry and the United States Public Health Service for reply.

The Bureau of Animal Industry writes:

"In regard to quarantines on account of foot and mouth disease which now prevails in certain sections of California, you are informed that the movement of fruits and vegetables or of any other material from premises on which the disease has been found is prohibited until all danger of the possible transfer of the virus through such materials is eliminated. Under no condition is the sale or movement of milk from any infected premises permitted. The possibility of fruits and vegetables grown and handled on noninfected premises becoming contaminated with the virus of the disease is so remote that their movement in interstate commerce is not restricted by the federal quarantine regulations for the control of foot and mouth disease."

The Public Health Service writes:

"From the available information it seems evident that vegetables and fruit play no practical part in the transmission of foot and mouth disease to human beings.

"The measures now in force in California are quite stringent in regard to milk or other farm products coming from infected territory. Absolute quarantine is maintained against the infected premises. In addition, all milk coming from any locality in which infection has been discovered is pasteurized prior to shipment.

"It would appear that the measures taken by the California authorities and the Department of Agriculture are sufficient to protect the public."

**Subject: Occupational Therapy.**

[*The Forum Committee makes its grateful acknowledgment for helpful assistance and advice in answering the following question to the American Occupational Therapy Association and the Medical Service of the National Tuberculosis Association.*]

Q. Would occupational therapy be practical in a tuberculosis hospital with an average census of forty men and women?

A. The answer would depend somewhat upon the character of the patients, that is, whether they were largely advanced, hopeless cases, too ill to engage in diversion or to receive benefit from the application of remedial measures.

In general, occupational therapy is practicable in a sanatorium with an average census of forty. Prescribed exercises and occupations are pretty well established now as a valuable remedial measure in the treatment of tuberculous disease, both from the psychologic and the physiologic standpoint. Occupational therapy can serve its greatest usefulness only when applied by a trained worker in full sympathy with and under the supervision of the medical director. The employment of a manual training teacher or an artist or a social worker, without special training for this particular type of patient, is usually far from satisfactory.

A properly trained worker will require a salary somewhere in the neighborhood of $90 a month with maintenance. Figuring maintenance as about $600 a year, the per diem expense, exclusive of materials, will be $4.60. With forty patients the per capita would be increased .115 cents a day. This does not seem an excessive cost for the undoubted value to the patients. Generally it is possible to interest some local group, such as the Tuberculosis Committee, Rotary and Kiwanis Clubs, etc., in furnishing materials. When a salable product is made it is generally possible to get back a part of the price of materials, although this feature should not be emphasized.

The tendency now is to simplify occupational therapy for the tuberculous and lead the patients in doing things that are less expensive than some of the occupations that have been used heretofore, such as jewelry manufacturing, some types of weaving, etc.

As an alternative to the employment of a full-time worker, it has been found feasible and satisfactory in many small institutions to share the services of an occupational therapist with some neighboring institution.

### Subject: State Laboratories—Scope of Work.

Q. Is it right and desirable that a state or city, through its public laboratory service, should do Wassermann reactions for its medical profession?

A. This question in its larger significance relates itself to a generally accepted policy and practice on the part of public laboratories, state and municipal. The question is really one as to the scope of laboratory practice. If it is right for a public laboratory to make diagnostic tests for the medical profession in order that the profession may more accurately and expeditiously diagnose and treat diseases, then it is right and desirable for public laboratories to do Wassermann's for the same reason that they do examinations of sputa for tuberculous bacilli, examinations of blood for Widal reactions, etc., etc.

The possible conflict of the interest of a few private laboratories with that of the public should not, of course, be allowed to stand in the way of the general interest. The individual should not block traffic.

### Subject: Garbage Removal.

Q. What is the present attitude of health authorities with reference to garbage collection as one of the functions of municipal health departments?

A. It is the opinion of health authorities that garbage disposal is not a proper function of the health department for the following reasons:

1. No technical training, either as a physician, nurse or engineer, is necessary for one to recognize a pile of trash or a collection of garbage.

2. While garbage is unsightly, just as are improperly placed posters and billboards, it is not, except to a very limited extent, related to disease. It is true that in the hot season and in the warmest climate garbage may serve as a breeding place for a limited number of flies but as such a breeding place it can almost be disregarded if horse stables are properly cared for.

An indication of the change in the attitude of health officials to garbage removal as a function of health departments is found in the fact that in the survey of 83 cities in 1920 only 21 stated that garbage collection was a part of the work of the health department. In most cities this work is now being handled by the department of public works or some other bureau or division independent of the health department.

That more needs to be said against the inclusion of garbage removal as a function of the health department is indicated by the fact that some cities are even yet spending from 15 to 40 per cent of money appropriated for health work on garbage removal, and most of

the largest expenditure per capita to health functions, as brought out in the survey of 1920, to-wit, 9.1 cents per capita, still goes largely for garbage removal.

It is interesting in this connection to note that in its study and tabulation of the financial statistics of city cost, the Bureau of the Census of the Department of Commerce does not include garbage removal in its conservation of health column.

A good discussion of this question will be found in the January, 1924, issue of the AMERICAN JOURNAL OF PUBLIC HEALTH.

### Subject: Widal Reaction.

[*The Forum Committee makes its grateful acknowledgment for helpful assistance and advice in answering the following question to the Hygienic Laboratory of the United States Public Health Service.*]

Q. What is the present attitude of health departments in regard to the reliability of the Widal test?

A. Two developments have had a very large influence in modifying the dependence of health departments and the medical profession upon the Widal test as formerly used: One of these developments is the vaccination during recent years of a large percentage of the population. This of course has made the Widal test of less diagnostic value in the recognition of typhoid fever. The other development is the improvement of laboratory technique through which we can more readily detect the typhoid bacilli in the blood of those infected. This of course means that the Widal reaction is less necessary than formerly. A good discussion of this subject will be found on page 729 of the August, 1921, AMERICAN JOURNAL OF PUBLIC HEALTH.

### Subject: Tuberculin Test for Dairy Herds.

Q. How extensive would the infection in a cow reacting to the tuberculin test have to be for the milk of such a cow to be dangerous to human beings?

A. If the cow reacts to a tuberculin test her milk should be considered dangerous without respect to the extent of the disease.

Q. What part of the animal would be infected for the tuberculous bacilli to find entrance into the milk of such an animal?

A. Rosenau states on page 777 of the fourth edition of his book on *Preventive Medicine and Hygiene* that only 1 to 2 per cent of tuberculous cows infect their milk directly from a tuberculous udder. Most of the infection is coughed up from the lungs, swallowed, the intestinal content infected, and the infection of milk in the vast majority of cases is through the manure. The danger from feeding defective meat is relatively slight on account of the heat to which the meat is subjected in cooking.

Q. What per cent of the cities of the United States depend on the tuberculin testing to protect their people?

A. See pages 175 and 176 of the Report of the Committee on Municipal Health Department Practice, or Public Health Bulletin No. 136. For 39 of the 83 cities surveyed, all herds were tuberculin tested. Certainly a minimum and reasonable requirement is that all cattle furnishing milk that is to be sold raw should be tuberculin tested.

Q. What per cent of the cities served require the pasteurization of milk?

A. See page 177 of the Public Health Bulletin No. 136. Ninety-five per cent of the milk supplies of the surveyed cities, embracing a total population of about 28,000,000, is now pasteurized.

□

## MEMBERSHIP LIST

The complete membership list of the American Public Health Association was last published in 1918. Although every effort has been made to keep our office records continuously up to date and correct, we are aware that there are many errors in the list which follows—in spelling, degrees, addresses, etc. Corrections to the list will be very gratefully received, and every member is urged to make certain that his name and title are entered the way he wishes them carried on the Association records.

Attention is called to the fact that only names of members in good standing appear in the list. Subscribers to the JOURNAL are not members of the Association. Pending members, or members awaiting election, are listed elsewhere in this JOURNAL.

# EMPLOYMENT BUREAU

## HELP WANTED

Help wanted announcements will be carried free in this column until further notice. Copy goes to the printer on the 8th of each month for publication on the 20th. Mail to New York office as early as possible.

In answering keyed advertisements, please mail replies separately to business office in New York City. In replying give age, professional training, salary requirement, previous positions held and three or more references.

Wanted: Woman bacteriologist also familiar with statistical work. Child Health Demonstration, Murfreesboro, Rutherford County, Tennessee. Address replies Room 1722, Penn Terminal Building, New York City.

Wanted: Capable man to take care of municipal board of health laboratory. Work to include usual diagnostic tests, milk and water analyses. Present salary $1,500. Address Room 214, City Hall, New Britain, Conn.

Class A, midwest **medical college** will about January 1, 1925, appoint an assistant professor at a salary of $3,500. Duties involve didactic laboratory and field instruction for medical and nursing students. Opportunity for independent research. Excellent hospital connections. It is desirable that appointee have M.D. or D.P.H. degree. Preferably male not over thirty-five. Applicants should supply all possible information. Address 564, D. K. M., care of this JOURNAL, New York address.

Wanted: District health officer for fourteen counties, preferably with public health training and experience. Address Bureau of Communicable Diseases, State Board of Health, Jacksonville, Florida.

Wanted: Full-time health officer, preferably with M.D. degree, for eastern city of 50,000 population. Position open October 1. Free from political interference, and tenure of office dependent solely on satisfactory performance of its duties. Salary $4,000 per annum. Address 569, R. V., care of this JOURNAL, New York address.

Wanted: A capable secretary-stenographer, with public health training or experience in a health department. Position offers interesting opportunities. Give age, references, and salary required. Address 573, W. R., care of this JOURNAL, New York address.

**Wanted:** By a national health organization, a man with training or experience in municipal health work. Position requires some travel, and offers unusual opportunity to a capable man. Give age, training and experience, references, and salary required. Address 574, P. H., care of this JOURNAL, New York address.

## POSITION WANTED

Positions wanted announcements will be carried for individuals at a charge of $2.00 per insertion. Copy should be received at the New York office by the 8th of the month preceding publication.

**Wanted:** Position as full-time health officer of state, county or city. Have successfully held positions as director of division in state health department, director of county health unit, municipal health commissioner. Present position, city-county health commissioner. Fellow of the A.P.H.A. and A.M.A.; class A references from all former positions. Graduate of class A medical and public health schools. Seven years' experience in health work. Present salary $5,000.00. Southern or southwestern states preferred. Address 304, P. W., care of this JOURNAL, New York address.

**Secretary-Stenographer:** Position wanted in laboratory, physician's office, or with group of physicians, by experienced stenographer, familiar with medical terminology. Able to work without direct supervision and take charge of office. Formerly a teacher. Address 302, N. M., care of this JOURNAL, New York address.

**Wanted:** Position as full-time health officer or other administrative position in public health, by man with M.D. degree, who is at present health officer in an eastern industrial city, but who desires greater opportunities. Address S. R. 300, care of this JOURNAL, New York address.

**Bacteriologist:** University graduate trained in public health, B.S. degree, is open for position with city or state health department. Has had seven years' experience in public health laboratory work and is a Fellow of the A.P.H.A. At present in charge of state laboratory. Address 301 W, care of this JOURNAL, New York address.

**Wanted:** Public Health work by man holding M.D. degree, forty-one years of age, married. Served as surgeon in coal mining company and in lumber company on Pacific coast. General practice before the war. Sanitary inspector of division in France and Germany. Desirous of getting out of general practice into public health work. Address 303, H. C., care of this JOURNAL, New York address.

## UNITED STATES CIVIL SERVICE EXAMINATION

Bacteriologist (Medical): Receipt of applications will close August 12. The examination is to fill a vacancy in the Hygienic Laboratory, Public Health Service, at an entrance salary of $3,000 a year.

Applicants must have been graduated from a college of recognized standing, with major work in bacteriology; and, in addition, must have had at least three years of graduate work or experience in medical or public health bacteriology of a research nature.

The duties of the position are to perform independently or with associates or through subordinates work of major importance in bacteriology.

Competitors will not be required to report for examination at any place, but will be rated on their education, training, and experience, and a thesis or publication on some subject connected with bacteriology to be filed with the application.

Junior Bacteriologist (Medical): The examination will be held throughout the country on August 6. It is to fill vacancies in the Hygienic Laboratory, Public Health Service, at an entrance salary of $1,740 a year.

The duties of the position are, under immediate supervision, to perform scientific work in bacteriology and related work as required.

Competitors will be rated on practical questions in bacteriology and laboratory technique, and education, training, and experience.

Full information and application blanks may be obtained from the United States Civil Service Commission, Washington, D. C., or the secretary of the board of U. S. civil-service examiners at the post office or custom house in any city.

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# BOOKS AND REPORTS REVIEWED

**Livestock Sanitation.** *A Collection of Short Popular Articles Bearing Upon the Subject. W. H. Dalrymple, M.R.C.V.S., Department of Veterinary Hygiene, Louisiana State University. Baton Rouge: The Gladney Press,* 1923. Price, $2.00.

The close relationship between man and the domestic animals, the many services of animals to man, and the diseases which may be transmitted from animals to man, all make this book interesting and valuable. Even physicians need to know more about the care of animals, and the ignorance of the general public leads to cruel practices often resulting in loss.

The section on foods and feeding is comprehensive, accurate and up to date. Vitamins are considered, but as is pointed out, animals eat a large part of their food in the raw state, so that a well balanced ration will generally give sufficient vitamins for proper nutrition. Since the vitamin content of milk may vary with the food supply, it is well for the owner of the dairy cow to remember the value of fresh vegetable food for his animals.

The advice on water is excellent. Too often animals are allowed to drink from any source regardless of its character. One needs only to examine a few farm stables, or milch cows plastered with their own excreta, or bottles of milk from which the dirt has settled, to appreciate the chapter on disposal of manure, and to realize the sinful waste of fertilizer which is needed on the soil but not needed for human or animal nutrition. The economic value of manure, entirely apart from its undesirability as a food, is made evident.

A section on microbial and parasitic diseases gives a good outline of common infections met with, and with methods of prevention.

The section, "Mistreatment of Livestock" is worthy of especial commendation. It seems hard to believe that such ignorance can exist

in this day and generation, but such is the fact. The treatment of simple, and sometimes imaginary, ailments is often worse than useless and often barbarous. The reviewer has seen many horns bored and turpentine inserted for the cure of "hollow-horn," and attempts made to knock out the "blind-tusk" by driving a nail through the nose. Lampers is often treated by searing with a red-hot iron.

The book is written for popular reading in plain, concise and readable English, well illustrated. We bespeak for it a wide circulation and commend it especially to the attention of those who waste their time in fighting investigations which are useful to man and beast alike, with the hope that some may be induced to divert their present misguided energies to the wide distribution of this book, written by one who knows and loves animals as well as his fellow-man.

✤

**The Mind and Heredity.** *Vernon L. Kellogg. Princeton: Princeton University Press.* vi+108 pp. Price, $1.50.

This series of ten general lectures delivered at Princeton University on the Vanuxem Foundation by Dr. Kellogg deals with evolution of psychical activities in lower animals, such as wasps, honey bees, and silkworms. To their psychical behavior which is limited to tropisms and reflexes of the mechanistic type he extends the term mind, basing this widened concept upon the evolutionary analysis of such phenomena throughout the whole animal kingdom. This method of approach serves to illuminate his analysis of the fundamentally important play of instincts in human behavior. In his chapter upon intelligence tests the author supports the validity of their value and significance in counteracting that curiously persistent fiction, the equality of men in their personal attributes. He skillfully directs attention to the fact that these tests apply only to intelligence or inborn capacities but not to other valuable human qualities. These tests have real social values in adapting education to children and in the choices of vocations by youths. They also reveal the social and political values of racial homogeneity, or at least the dangers of certain racial infiltrations and the results of dangerous selective immigration which in recent years has flooded our nation with an increasing proportion of the less capable elements of the European peoples. While the author stresses the values and significances of heredity he is not unmindful of the environment. Nature and nurture are complementary not antithetic. Both are essential for the individual and for society.

✤

**Hygiene and Public Health.** *Lewis C. Parkes, M.D., D.P.H., the Consulting Sanitary Adviser to H. M. Office of Works, and Henry R. Kenwood, C.M.G., M.B., Professor of Hygiene, University of London. Published by P. Blakiston's Son & Company, 1012 Walnut Street, Philadelphia.* Seventh edition, 90 illustrations, XI, pp. 783. Price, $7.00.

This is one of the standard reference books on this subject. In their latest edition the authors have omitted the chapter devoted to Sanitary Law and Administration, feeling that this subject cannot now be treated satisfactorily in a single chapter. They refer the reader to books which, being entirely devoted to this subject, can treat it with the necessary fullness. Even with this expressed omission the administrator will find his subject and the discussion of his problems interwoven with the presentation of the various subdivisions of public health work, all of which are presented with admirable detail and conciseness.

The book gives us a splendid insight of English health procedure and there have been added valuable statistical data. One startling statement is to the effect that in the year 1919 primary vaccinations for smallpox in infancy were only 40.6 per cent of the births registered in England and Wales, and the exemptions granted on account of conscientious objection by parents to vaccination were 40.1 per cent of the births. We who have seen the disastrous results of neglect and disregard for vaccination in America cannot but be fearful for the future smallpox incidence and mortality in England and Wales. The gradual creation of a large combustible material will ultimately result in the breaking of the record to which the English sanitarian has pointed with such legitimate pride.

We strongly recommend this book, feeling it to be a worthy addition to the library of every sanitarian.

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**First Steps in Organizing a Hospital.** *Joseph J. Weber, M.A., Editor, The Modern Hospital, New York. The Macmillan Company,* 1924. Pp. 205. Price, $2.75.

This is one of a series of projected handbooks on various phases of hospital organization, construction and management. It is in-

tended as a guide to those who contemplate the construction of a community hospital and should be especially helpful to those who must organize from the bottom up. It is designed primarily for that farsighted citizen who sees the need of a hospital for his community but who doesn't know just how to begin or proceed. There must first be a survey of the area to be served, expert advice and aid may be needed, a board of control must be organized and above all the construction must be financed and provision made for maintenance and upkeep.

✤

**Medical and Sanitary Inspection of Schools.** *S. W. Newmayer, M.D., Supervisor of School Medical Inspection, Philadelphia. Lea and Febiger,* 1924. Pp. 462. Price, $4.00.

The author gives a very complete and interesting description of the system of medical school inspection which has been long tried and found satisfactory in the city of Philadelphia. Little attempt has been made to deal with some of the newer developments in other large cities and in the rural sections. We could find no reference to the survey undertaken by a committee of the American Public Health Association with the assistance of the United States Public Health Service and other agencies.

The book is divided into seven parts dealing with the following subjects: administration, including a description of the requirements for a medical inspector and school nurse; sanitation and construction of school buildings and grounds; communicable diseases; physical defects; health of teachers; mentality; allied subjects of school medical supervision including a discussion of rural school sanitation and child labor control.

The book is well illustrated and contains many valuable forms and tables.

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**Home Sewage Disposal.** *W. A. Hardenbergh, Sanitary Engineer and Director of Rural Sanitation, Jefferson County, Board of Health, Alabama. Philadelphia: J. B. Lippincott Company,* 1924. Pp. 274. Price, $3.50.

There are available to the sanitary engineer and health officer many splendid and complete treatises on sewerage and sewage disposal, all of which deal with the subject as a community problem and fail, for the most part, to discuss the difficult situations which confront the sanitarian who must solve the waste disposal problem for small communities, institutions, rural sections and the like. This field is thoroughly and admirably covered by the author in his new work. The medical and public health literature is full of articles on rural sanitation and the reports of the United States Public Health Service, the International Health Board, and other organizations are invaluable to those who may have ready access to these publications, but there has been no correlation of the material until the advent of the present volume. The book should not only appeal to the rural health administrator and sanitary engineer but likewise to the city health official who is frequently confronted with such problems when annexations are made to his city and there has been no prearranged extension of sewerage and water systems.

✤

**What Is Man?** *J. Arthur Thomson, M.A., LL.D., Professor of Natural History, Aberdeen. New York: G. P. Putnam's Sons,* 1924. x+331 pp.

This latest work of the author of "The Outlines of Science" is based on a series of ten popular lectures treating of man's pedigree, his primitive representatives, the evolution of his mind, the origin of human society, the rôles of urges and instincts in his behavior, his variability and his inertia, the winnowing of the human stocks, racial origins and contacts, disharmonies and disease, and the future of human evolution. The author's name is a guarantee of the attractiveness of the book. His judgment on the eugenics program is cautious and constructive. He pleads for social appreciation of the racial values of the finer human types and for well-paid labor and gardens rather than the sweatshop and the slums, for pride of race and pride in wholesome children, rational prejudices against mismating and for advance in standards of health of body and mind. Declining birth rate *per se* does not alarm him in the face of the population problem, but its differential trend and the possible deterioration of chivalry and the affections bring a word of caution. The chapter on disease is a plea for the union of science and good will in ridding human life of many of its disharmonies and lifting some of its shadows. To this end we need a constructive enthusiasm for good health as well as a remedial program, especially to raise the standard of health and efficiency in the later years of life.

# PUBLIC HEALTH LABORATORY NOTES

C. C. YOUNG

**Medium for Inhibition of Spreaders and Differentiation of B. Coli and B. Aerogenes.**—The usual peptone-sugar agars which are commonly used for the isolation and identification of B. Coli have proved unsatisfactory in that the colon organisms cannot be easily differentiated and also that in soil work, the plates will be overgrown with spreaders. Experiments were carried out to find a suitable new medium. The eosin-methylene blue agar as simplified by Levine was used as a basis, and crystal violet was added in various dilutions to inhibit spreaders. A dilution of 1-100,000 was found not to inhibit B. Coli and B. Aerogenes, but would inhibit all growth of spreaders in 24 hours and over 50 per cent of growth at end of 48 hours. On this medium, B. Coli could be easily distinguished from B. Aerogenes colonies.—C. E. Skinner and T. J. Murray, *J. Inf. Dis.*, 34: 585 (June) 1924. E. S.

✤

**Bacteriostatic Action of Acid Fuchsin.**—The reverse selective action attributed to acid fuchsin can be explained on the basis of spore resistance. This action does not apply to the vegetative cells of Gram-positive spore bearers. It cannot be extended to include the Gram-negative spore bearers. The selective action of acid fuchsin is that of an ordinary weak disinfectant and is not comparable to the selective action of the triphenylmethane dyes. A lack of parellelism between the bactericidal and bacteriostatic action of acid fuchsin can be explained on the basis of spore resistance and it does not exist when spores are excluded. Acid fuchsin is a weaker disinfectant than basic fuchsin for both Gram-negative and Gram-positive bacteria. The process of sulphonation by which acid fuchsin is made from basic fuchsin results in a reduction in the bactericidal action of the dye for Gram-negative and Gram-positive bacteria. The most significant fact in the action of the dyes on bacteria is the toxic effect of the triphenlymethane dyes on Gram-positive spore-bearing organisms.—Burke and Skinner, *Jr. Exp. Med.*, 39:613 (April), 1924. M. S. M.

**Food Accessory Factors (Vitamins) in Bacterial Growth—Relation of Substances Formed by B. Coli to the Growth of Yeast.**—The author prepared a synthetic medium containing chemically pure: asparagin (Merck), calcium chloride, dextrose, magnesium sulphate, dipotassium phosphate, sodium chloride, and sterile distilled water. B. coli communis when inoculated into this media continued growth but when yeast was inoculated on to it growth did not continue. When carrot or yeast extract was added to this synthetic media growth continued with both B. coli and yeast. When a Berkefeld filtrate of B. coli culture in this synthetic media was inoculated with yeast, growth continued. The author concludes that B. coli is apparently capable of continuing growth on a vitamin free media while yeast is not. And that by the growth of B. coli on a synthetic media, substances are synthesized which permits the growth of yeast on the Berkefeld filtrate.—R. C. Robertson, *Jr. Inf. Dis.*, 34:395 (April), 1924. L. D. H.

✤

**Action of Typhoid Bacillus on Russell's Double-Sugar Medium.**—There are two different explanations of the reaction of Russell's double sugar when inoculated with a member of the typhoid-dysentery group. For example, B. paratyphosus B gives an alkaline slant and an acid butt. According to Russell, the oxygen supply is the determining factor. On the slant, where oxygen is abundant, dextrose is not fermented and the slant remains alkaline but in the butt, where the oxygen supply is limited, dextrose is fermented and the butt becomes acid. According to Nichols, and to Nichols and Wood, the oxygen supply is not the determining factor, but carbon dioxide is. They claim dextrose is fermented the same all over and that carbon dioxide is produced, that the $CO_2$ escapes from the slant, thus leaving the alkaline products and that $CO_2$ is retained in the butt, thus the acid. The author, in a series of experiments, came to the conclusions that: all dextrose in the slant of a typhoid Russell's double sugar tube is fermented within 15 hours, and in the butt within 21 hours, provided the percentage of dextrose is 0.1 per

cent or less. This determination was made by inoculating a Russell's tube containing varying amounts of dextrose from 0.1 per cent to 1.0 per cent inclusive. After 24 hours incubation, the agar was melted down, readjusted and reinoculated. After 24 hours incubation the second time, the media containing 0.1 per cent dextrose showed no acid, 0.2 per cent dextrose tube showed slight acid and all others showed marked acid production. Experiments were conducted in regard to the volatile acid produced with the results that although the production of the volatile acids were dependent on the oxygen supply, they had no direct bearing on the appearance of a typhoid Russell's tube. And the author claims these acids are respiratory and not fermentative in origin which is contrary to the views of Nichols and Woods.—G. E. Wheeler, *Jr. Inf. Dis.*, 34:13 (January), 1924. L. D. H.

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**The Serum Constituents Useful in the Cultivation of the Gonococcus—A Method of Sterilizing Serum; Relative Merits of Serum and Muscle Extract.**—In the sterilization of sera for standard nutrient agar media, experiments established two critical points in the temperature scale at which the serum was altered. On media containing serum heated above 100° C. for half hour or more, only old stock strains grew; heated above 65° C. stock strains and primary cultures grew well, but usually no growth in first three subcultures; below 65° C. growth was equal to that obtained with fresh unheated serum; prolonged heating in any one zone did not alter the reaction, and fresh sera of the ox, sheep and rabbit gave equally good results as did human serum. Because of the low temperature requirements for initial growth, difficulty was met in sterilizing media, and the author has outlined a method of chemical sterilization using 1 per cent HCl in conjunction with chloroform and low heat. Other media using muscle extracts gave partially successful results; especially those obtained by digesting the meat with lactic acid, the technique of which is outlined.—G. E. Jenkins, *Jr. Path. & Bact.*, 27:145 (April), 1924. L. W. G.

✚

**Nonspecific Training of Antibody Production.**—Acting upon the experimental evidence that inoculation of an animal with one sort of bacillus enhances its production of antibodies to another kind of organism subsequently injected, the author attempts to examine the range of such antigenic overlapping. Rabbits, inoculated several times with Gaertner's bacillus and various other antigens were later given test doses of Gaertner's bacillus, and the agglutinin content of their serum for this organism then determined. He arrives at the conclusions that: (1) previous inoculation of Gaertner's bacillus very much increases the capacity of an animal to respond to the same antigen; (2) training with organism which on general grounds may be regarded as more or less closely allied to Gaertner's bacillus (coli and paratyphoid "B") also improves the antibody response to a dose of Gaertner's bacillus; and (3) training with more distantly related organisms (staphylococcus, yeast) or with proteids from higher animals (horse serum) or plants (ricin) has no effect on the response to Gaertner's bacillus.—V. R. Khanolkar, *Jr. Path. and Bact.*, 27:181 (April), 1924. L. W. G.

✚

**Immunizing Strain of Poliomyelitis Virus.**—The author has described a strain of poliomyelitis virus obtained from a rapidly fatal human case which is only mildly infective for monkeys and gives a marked protective effect for a potent virus. Nearly all the monkeys inoculated responded to the inoculation, but none succumbed. As compared with previously described experimental poliomyelitis this modified disease is distinguished by its relatively benign nature and its tendency to end in recovery rather than in death.—Flexner and Amoss, *Jr. Exp. Med.*, 39:625 (May), 1924. M. S. M.

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**Activity of Poliomyelitis Virus.**—The virulence of a poliomyelitis virus as tested upon monkeys appeared to pass through several stages. The first consisted of the adaptation of the human virus to monkeys, in which high virulence was readily achieved. After about three years of regular passage through monkeys the virulence diminished, approximately to the level of the virulence of the original human virus. The third and next stage is the recovery of high virulence, occurring several years after the virus was left in glycerol. In this medium the potent virus remains active for at least four years. A superficial resemblance between these stages and the wave-like rises and falls in poliomyelitis incidence is pointed out, the chief difference being the time factor.—Flexner and Amoss, *Jr. Exp. Med.*, 34:191 (February), 1924. M. S. M.

Relation of Reaction of **Intestinal Contents** to Diet and Flora.—Experiments were carried out to establish the change in the intestinal contents and the intestinal flora when white rats were fed on diets consisting of high protein and high carbohydrate content. A carbohydrate diet, fed to rats on a high protein diet, and sufficient to change the flora from gram-negative to gram-positive type produced a change in the H-ion concentration, changing it from around the neutral point to frank acidity.—N. Paul Hudson and Leland W. Parr, *Jr. Inf. Dis.*, 34:621 (June), 1924. P. C. Y.

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The Significance of **the Pseudoreaction in** the Dick Test and **Methods Used for Its** Identification.—The author found that pseudoreactions due to the autolyzed streptococcus protein and other protein constituents of the toxin broth test fluid have an important bearing in the interpretation of the Dick test. In a public school 459 children were found to be immune. Of these 190 gave a pseudoreaction and 130 gave a combined positive and pseudoreaction. In another group 686 were found to be immune. Of these 232 gave a pseudoreaction and 264 nonimmunes gave a combined reaction. It is of importance in order to make the readings of the Dick test accurate to use a control test. Three different solutions can be used: (1) a dilution of the toxin which contains 25 per cent of convalescent serum, obtained from three weeks scarlet fever convalescents; (2) a dilution of the toxin which contains 25 per cent of normal serum, obtained from individuals who give a negative Dick test; (3) streptococcus scarlet fever toxin which has been heated. The toxin that gives rise to the positive reactions is destroyed by heat while the reacting proteins that cause the pseudoreactions are not affected. The heated scarlet fever streptococcus toxin may be ultimately used as a control as it can be more conveniently prepared. However, out of a group of 200 children there were 40 on whom the neutralized convalescent serum toxin acted as a more perfect control than the heated toxin.—Abraham Zingher, *Proc. Soc. Exp. Biol. & Med.*, 21:385 (April), 1924. H. B.

✚

**Hydrogen-Ion Studies.**—The author's survey of the literature shows that various workers have prepared dry powders with specific immune properties. Rosenow was among the first to prepare powdered antitoxin for diphtheria from immune horse serum. The sterile horse serum is put through a series of precipitations, the final precipitate being ground up and carefully stored. In these preparations, there are certain points to be controlled. The solubility of the dried substances is determined, in a measure, by the proper ratio of salt and hydrogen-ion concentration in the final precipitating mixture. If the reaction be made too acid the dried substance is likely to become insoluble and consequently inert. The dry powder is a protein-acid salt readily soluble in water and in solution actively potent. Agglutination has been obtained with the mixtures of homologous bacteria in dilutions containing 0.0035 mgm. and 0.0022 mgm. of dry weight per c.c. Some of these preparations have been stored five weeks without loss of potency.—Edwin F. Hirsch, *Jr. Inf. Dis.*, 34:390 (April), 1924. L. D. H.

NOTICE

Each month we desire to publish in PUBLIC HEALTH LABORATORY NOTES two or three short articles (not exceeding 250 words) dealing with some phase of applied bacteriology, labor saving devices, modified methods, etc. Contribution should be in the hands of associate editor before the fifteenth of each month.—C. C. YOUNG.

# VITAL STATISTICS

LOUIS I. DUBLIN, PH.D.

**Meningitis Distribution According to Age and Etiology.**—Of 1,535 cases of meningitis arranged according to age and etiology, it is seen that with the exception of tuberculous meningitis more cases of meningitis occur in the first year of life than in any one year. The number of cases of meningococcic meningitis in the first year of life (150) far exceeds those in any other year (the total being 625). The greatest number of cases of tuberculous meningitis (662 in all) is found in the second year of life (178). In times when there is no epidemic, the number of cases of tuberculous meningitis equals or exceeds the number of cases of meningococcic meningitis. After the meningococcus come, in order of frequency, the pneumococcus (86 cases), the streptococcus (83 cases), the influenza bacillus (51), the staphylococcus (11), and colon bacillus (5). Cases due to the last two organisms are comparatively rare.

Other pyogenic organisms occasionally cause a meningitis, and, more rarely, members of the higher group of organism, such as the members of the streptothrix group and the pathogenic yeasts. Mixed infections are rare.—J. B. Neal, *J. A. M. A.*, 82:1429–1430 (May 3), 1924.

✤

**The Calcium Content of Breast Milk in Relation to Rickets.**—In a study of the calcium content of breast milk the average of normal milks has been found to be 32.6 mg. per 100 cubic centimeters, with extremes of from 23.7 to 40.0 mg. The "rachitic" milks averaged 27.5 mg. with extremes from 18.4 to 39.6 mg. Grouping the milks according to the age of the infant the calcium content was found to diminish as lactation progressed. The calcium content of milk from the white race as compared with that of the colored shows a reduction in the latter race.—L. R. De Buys and L. Von Meysenburg, *Am. J. Dis. Child.*, 27:439–443 (May), 1924.

✤

**Health Record for April, 1924.**—The general death rate for the large cities of the United States during April was 14.4 per 100,000 estimated population. This is a trifle lower than the rate for the previous month and practically identical with that for April, 1923. Increases in case prevalence were reported in April, as compared with March, for smallpox, typhoid fever, and malaria. There was less diphtheria, influenza, measles, poliomyelitis, scarlet fever, and whooping cough. Compared with April, 1923, there was more measles, malaria, poliomyelitis, scarlet fever, smallpox, and typhoid fever, with fewer cases of diphtheria, influenza, and whooping cough.

The course of the death rate in April, among Metropolitan industrial policyholders was unusual. Instead of the customary decline as compared with March, a considerable rise was registered. It is very possible that this is a reflex of the unseasonable weather conditions that have prevailed this spring.

Increases were recorded, as compared with March, for organic heart disease and tuberculosis. Among other conditions, which, although not important numerically, are still of major public health interest, for which the death rate increased in April, are measles, scarlet fever, whooping cough, diarrheal complaints, and puerperal diseases. In the cases of most of these, the death rates were also higher than in April a year ago. Declines, as compared with March, were recorded for diphtheria, cerebral hemorrhage, pneumonia, and Bright's disease. The leading cause of death in April was pneumonia. This registered a slight decline as compared with March, but at the same time recorded an increase of 2½ per cent over the figure for the month of April, a year ago.—Statistical Bulletin, Metropolitan Life Insurance Company (May), 1924.

✤

**Homicide Record for 1923.**—The trend of the American murder record continues in an upward direction. In 28 cities for which the data for the entire period is available since 1900, the murder rate has practically doubled in 24 years. The 1922 murder rate for England and Wales was about 4 per million and that of Scotland about 3.6 as against the 1922 rate of 90 for the 28 cities and the 1923 rate of 102. The 1922 murder rate for the U. S. Death Registration Area was 8.4 per 100,000 for the entire population, 5.6 for the white population and 30.7 for the colored.

These rates do not reveal the full extent of the murder situation in particular localities.

In Atlanta, Ga., the white murder rate was 26.5 per 100,000, but for the colored population the rate was 105.4. For Birmingham, Ala., the white rate was 26.7 and the colored rate 108.0. For Memphis, Tenn., the white rate was 24.6 and the colored rate 145.2.

The 1912-1916 rate for the 28 cities was 8.7, that for 1917-1921, 8.9, that for 1922, 9.0, and that for 1923, 10.2. The major factor in the murder record is death by firearms. In 1921 the rate for all methods was 8.5 per 100,000, of which 6.2 was due to death from firearms. In England and Wales in 1922, only 16 out of 202 deaths were caused by this method.

The Metropolitan Life Insurance Company for ordinary and industrial risks, paid the following in homicide claims: 1920, $431,691; 1921, $534,800; 1922, $609,341; 1923, $723,788.

Of 79 cities for which figures were available for 1922 and 1923, Memphis heads the list with a rate of 65.0 and Jacksonville follows with 61.7. The rate is decidedly higher in the cities of the South than in the cities of the North and West.—Frederick L. Hoffman, *Spectator*, 112:3 (May 8), 1924.

✤

**Births and Deaths, England and Wales, First Quarter of 1924.**—The births registered in the first quarter of 1924 in England and Wales numbered 185,486 and were 7,049 more than in the preceding quarter, but 7,484 fewer than in the first quarter of 1923. The number of births corresponds to an annual rate of 19.4 per 1,000. This is the lowest birth rate recorded in any first quarter except during the period of the war.

The deaths registered 160,279 and were 45,495 more than in the preceding quarter, and 35,559 more than in the corresponding quarter of 1923. They included 79,706 males and 80,573 females, corresponding to an annual rate of 16.7 per 1,000. Influenza was a primary or contributory cause of death in 12,604 cases, or 7.9 per cent of the total deaths. The infant mortality was 102 per 1,000 births, this being 8 per 1,000 below the average of the 10 preceding quarters.—*Quarterly Return*, No. 301, Registrar General, England and Wales, 1924.

✤

**Provisional Birth and Mortality Figures, in the Birth Registration States and Cities, 1923.**—The Department of Commerce announces that birth rates for 1923 were lower than for 1922 in 21 of the 27 states for which figures for the two years were available. The highest 1923 birth rate (34.8) is shown for cities of Wyoming and the lowest (15.6) is for the rural districts of Montana. In the registration cities of over 100,000 population for which figures were available for the two years, Provo, Utah, had the highest birth rate (55.5), and Cleveland Heights, Ohio, the lowest (4.4).

Death rates for 1923 were slightly higher than for 1922 in 25 of the 36 states shown for both years. Connecticut, New York, and North Carolina had the same rates for 1923 as for 1922 and eight states had lower rates. The highest death rate (20.3) is shown for cities of Mississippi and the lowest (6.5) for the rural districts of Idaho. Of the registration cities the highest rate (excluding those where there are state institutions) was in Long Branch, N. J. (29.4), and the lowest (5.0) in Kenmore, Ohio.

Infant mortality rates for 1923 were generally higher than those for 1922, as 17 of the 27 states show higher rates in 1923. The highest 1923 infant mortality rate (117) appears for cities of South Carolina and the lowest (51) for the rural districts of Utah and the cities of Washington. Of 45 cities of 100,000 or more population 25 had lower infant mortality rates in 1923. The highest rate (110) was for Richmond and the lowest (48) for Spokane.—*Summary of Provisional Birth and Mortality Figures*, 1923, Department of Commerce, Bureau of the Census, Washington, D. C.

✤

**The French Birth Rate.**—French vital statistics for 1923 seem to indicate that the birth rate is at last tending upwards. In 1914 the population showed an excess of deaths over births of over 53,000, and this tendency towards depopulation continued until 1918, when deaths exceeded births by over 389,000. By 1920 an excess of 160,000 births over deaths was recorded. In 1921 an excess of 70,579 was recorded and in 1922, 94,871. This improvement, however, was almost entirely due to a substantial fall in the death rate. The marriage rate has fallen rapidly in the past four years.—*Med. Off.*, 31:208 (May 10), 1924.

✤

**Vital Statistics for Bavaria, 1923.**—The number of births in Bavaria for the first nine months of 1923 was 137,236 as compared with 143,975 in 1922 and 157,387 in 1913. This fact is no doubt due to financial depression for it appears that for the third quarter, for each marriage contracted nine months previously, there were in 1913, 4.0 births; in 1922, 2.4 births, and in 1923 only 2.2 births. The num-

ber of deaths for the first nine months of 1923 was 89,561 as compared with 89,688 in 1922 and 97,046 in 1913. The decrease in mortality over prewar years is explained partly by the decrease in the birth rate and partly in the transformation in infant mortality observable since 1921. The deaths under one year were: 21,502 in 1923, 22,682 in 1922, and 28,156 in 1913.—*J. A. M. A.*, 82:1798–1799 (May 31), 1924.

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**Health Conditions in Jamaica, 1922.**—The estimated population at the close of 1922 was 885,692. The birth rate for the year was 37.3 and the death rate 22.9. The total infant death rate under one year was 17.7 per population. In Kingston the principal causes of death were: diarrhea and enteritis, 6.7; atrophy, icterus and scleroma of the new-born, 10.9; phthisis, 10.8; enteric fever, 7.0; pneumonia, 5.3; heart disease, 6.2; chronic bright's disease, 4.3; cerebral hemorrhage and apoplexy, 4.4. The recrudescence of alastrim still existed during 1922, but the mortality was low and vaccination has proved an effectual preventive measure.—*Lancet*, 1:934 (May 3), 1924.

✚

**Health Conditions in North-West Frontier Province, India, 1922.**—The population of the frontier province in 1921 was 2,135,573. The birth rate was 23.7 as compared with 28.6 in 1917–21. The infant mortality rate was 151.5, a considerable improvement on the quinquennial average of 191.9. The rate is lower than for any province of India except Bihar and Orissa. The general death rate (21.7 as compared with 35.4, the mean ratio for the quinquennium 1917–21) showed a great improvement. This was due chiefly to the decline in malaria and influenza; this ratio was lower than that of any province in India, Punjab coming next with 22.07. Among the Indian nonmilitary population (32,902) living in cantonments the mortality was only 8 per 1,000.

The province was exceptionally free from epidemic disease. Cholera caused 92 deaths (0.04 per 1,000); of the total 129 cases, 69, with 53 deaths, occurred in Peshawar city. Anti-cholera inoculation was carried out with a total of 1,266 cases. The mortality ratio for smallpox was .05, the quinquennial average being 0.37. There was a definite decrease in fever mortality in all the settled districts throughout the province.—*Lancet*, 1:1038–1039 (May 17), 1924.

**Public Health in Tanganyika.**—This territory is part of the former German East Africa. The population in 1921 was: Europeans, 2,447, of whom 1,598 were British subjects; Asiatics, 14,991, and natives, 4,107,000. No statistics as to births or deaths are available. Of infectious diseases, plague, smallpox and cerebrospinal fever are endemic. There were 46 deaths from smallpox. Vaccinations steadily proceed. There was an outbreak of sleeping sickness in the Mwanza district. The epidemic was controlled. Venereal disease is common and syphilis is responsible for a large percentage of the heavy infantile mortality, and to a greater extent reduction of the birth rate. Most districts are malarious. The climate varies greatly and there are four or more climatic zones.—*Lancet*, 1:1039–1040 (May 17), 1924.

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**Health in the Tropics.**—New Zealand has an excellent report of health, except for the fact that the birth rate is declining and a typhoid fever outbreak was reported in 1922. The infant mortality rate was only 21.9.

New South Wales had an outbreak of diphtheria, with 6,854 cases and 306 deaths and reintroduction of plague after twelve years although but two people were infected. Phthisis, diphtheria and typhoid fever were the chief killing diseases in 1921, the death rate from phthisis, however, being only half that of England. The infant mortality in Newcastle is 247, but one cause, housing shortage, is being remedied.

In Kenya, Africa, there were no epidemics in 1922 and the general health was good. The native death rate is 19–23 per 1,000, the European only 9.04. Swaziland has had a good year as regards health, with very little malaria. Syphilis is very prevalent among the natives, and during the year there were outbreaks of both mild smallpox and mild influenza, the death rates of both being very low, in the case of the former due to extensive vaccination. Somaliland is evidently very healthy for Europeans; among the natives the only widespread infection appears to be venereal disease.

In Singapore, India, the death rate in 1922 was slightly higher than the birth rate, largely owing to the high infantile mortality rate, much of it the result of tetanus. The European death rate was only 9 per 1,000.

In Brunei, malaria, ankylostomiasis and venereal infection are prevalent. There have been no serious epidemics since 1906.

In the Federated Malay States the native birth and death rates almost balanced for 1922. The infant mortality rate was 170.8. Yaws is almost eradicated and syphilis is being energetically treated.

In some of the Unfederated Malay States the natives are highly infected with ankylostomiasis and ascaris lumbricoides, but there have been no serious epidemics. The infant mortality rate is high, 220 among Indians, 37 among Europeans. Puerperal fever causes many deaths. The cancer rate is stated to be only 25 per 1,000 for the natives.

In Ceylon where there are all kinds of medical requisites, the general health is very good. Cancer is at the bottom of the killing diseases with only 10.1 per 100,000. Pyrexia and infantile convulsions head the list.

In Assam Schick testing for susceptible contacts was most successful, this being the first set of tests carried out in India. Cholera took 16,000 lives and malaria and kala-azar are more prevalent than necessary.—*Lancet*, 1:1022-1023 (May 17), 1924.

✤

**Health Condition of the Falkland Islands, 1922.**—The estimated population on December 31, 1922, was 1,205 males and 937 females, total 2,142. There were 55 births and 15 deaths during the year. The health of the colony was good, there being no sickness of a serious character recorded. The climate on the whole is one of the most salubrious in the world.—*Lancet*, 1:934 (May 3), 1924.

✤

**The Morbidity of Endemic Goiter.**—Endemic goiter is a combination of colloid and adenomatous elements. The goiter called colloid up to the age of twenty-five is probably the same goiter called adenomatous at forty-five with the change in the prominence of the component parts. The adenomatous elements in most cases dominate the picture after thirty. A series of adenomatous cases analyzed as to basal metabolic rate shows that 100 per cent of age group ten to twenty shows a normal rate, 11.3 per cent of those twenty to thirty show an elevated rate, 30.0 per cent of those from thirty to forty, 32.0 per cent of those from forty to fifty, and 19.0 per cent those fifty and over. That is to say, the percentage of persons with hyperthyroidism increases up to age fifty.

In those cases in which there is a normal basal metabolic rate at the time of examination, a large percentage will show or develop eventually serious cardio-vascular disorders. The percentage increases with each succeeding decade. Operative removal should be advised for adenomatous goiters, at least by the age of thirty, as a prophylactic measure, even though no definite symptoms exist at this time.—F. A. Collier, *J. A. M. A.*, 82:1745-1748 (May 31), 1924.

✤

**Pneumonia Death Rate and Types of Pneumococci in Norway.**—Observations on the types of pneumococci have been made in Norway in order to ascertain whether there is any difference in the distribution of the different types in Norway and the United States. Sputum obtained from the hospitals in Christiania and from private practitioners was studied according to the accepted technic. Avery, Chickering, Cole and Dochez give the death rate of patients with pneumonia not receiving serum treatment in the hospital of the Rockefeller Institute in New York City as nearly 30 per cent; of type 1, 25 per cent; of type 2 as 32 per cent; of type 3 as 45 per cent; and of type 4 as 16 per cent. Of 100 cases of typical lobar pneumonia in the present study there were 44 cases of type 1, 33 of type 2, 6 of type 3, and 17 of type 4. According to Christensen the type incidence in Denmark runs as follows: type 1, 33 per cent; type 2, 27 per cent; type 3, 8 per cent; type 4, 32 per cent; type 1 being the dominating type, but less markedly so than in the present series. The distribution of the death rate of the 100 cases by type was as follows: type 1, 9 per cent; type 2, 6 per cent; type 3, 16.6 per cent; and type 4, 6.6 per cent; the total was 8 per cent.

A study of the morbidity and mortality from 1865 to 1917 in Norway shows that the morbidity averages about 5 per 1,000 inhabitants and the case death rate from 13 to 18 per cent. Christensen found the death rate to be 12 per cent in Denmark.

The difference in the rates for the United States and Norway is interesting because Norway has a wet and cold climate, and would seem more likely to have a higher death rate from pneumonia. It must be that the inhabitants possess greater resistance from pneumococcus infection than in the United States.—T. Thjotta and O. Hanneborg, *J. Infec. Dis.*, 34:454-458 (May), 1924.

# SANITARY ENGINEERING

ABEL WOLMAN, C.E.

**New Process of Garbage Disposal in Lebanon, Pa.**—Garbage disposal experiments having given satisfactory results, the city authorities have decided to dispose of the garbage of the city by grinding it, discharging it through the outfall sewer and into the Imhoff tanks which constitute a part of the sewage works of the city. It is estimated that the total cost of collection and disposal will not exceed $4 a ton. Volume of sewage treated is about 2 m.g.d. or 8,000 tons, of which 0.2 per cent is solids. As 75 to 80 per cent of the garbage is water, the addition of 10 to 12 tons of garbage a day to the sewage will not materially increase the total solid matter flowing to the Imhoff tanks.—Dr. Clarence R. Fox and William S. Davis, *Eng. News-Rec.*, 92:857 (May 15), 1924. A. W. B.

✤

**Small Water Purification Plant for Jacksonville, Texas.**—A small compact pump and filter plant under one roof, and a low earth dam are features of the new water supply recently completed for town of 4,500 people at a total cost of $153,000.—H. N. Roberts, Jr., *Eng. News-Rec.*, 92:859 (May 15), 1924. A. W. B.

✤

**New Spring Water Supply and Covered Reservoir, Batavia, D. E. I.**—Springs located 900 feet above sea level and 32.5 miles from Batavia, a seaport of Java, Dutch East Indies, a 26-mile steel pipe line of 18 to 24 inches diameter, a 5.5 m.g. (U. S. gal.) flow equalizing covered reservoir, 7.5 miles from the city, two 24-inch cast iron supply mains and 16 miles of distributing mains constitute waterworks improvements recently made by city at a cost of about $3,600,000.—C. Ortt, *Eng. News-Rec.*, 92:860 (May 15), 1924. A. W. B.

✤

**Waterworks Improvements at Wheeling, West Virginia.**—New waterworks will include new intake, pumping station with low- and high-service electric driven pumps, and a filtration plant of 20 m.g.d., providing a per capita supply of 350 gallons daily, and five 1 m.g. storage tanks. Several features include the feeding of pulverized calcium oxide in dry form, the installation of a dust arrester for unloading and handling chemicals, control of wash water by a Venturi rate controller, and the use of hydraulic plug valves for the drains in the mixing chamber and settling basins.—J. F. Laboon, *Eng. News-Rec.*, 92:848, (May 15), 1924. A. W. B.

✤

**Venturi Speed Controller for Dry Chemical Feed Devices.**—Installation at mechanical filter plant, Parsons, Kansas, varies chemical dose according to rate of flow of raw water. It consists of a Venturi indicator operated by a 20-inch tube of Venturi type; a speed changer, belt-driven by a constant speed motor; a countershaft and three belt-driven dry chemical feed machines.—E. S. Smith, Jr., and C. G. Richardson, *Eng. News-Rec.*, 92:844 (May 15), 1924. A. W. B.

✤

**Illumination and Its Effect on the Human Eye.**—Conditions of illumination, both as to kind and amount of light, have become very important engineering problems. Three essentials to good illumination are: (1) Illumination must be sufficient to enable objects to be seen clearly enough for the purpose in hand; (2) it must be reasonably steady; (3) there must be proper relative distribution of brightness within field of vision, or glare in its various forms must be avoided. Inadequate luminosity and excessive brightness of the direct field of view are both undesirable. In the former cases the retinal images are not distinct and the eye fatigues in its efforts to sharpen the details. Excessive brightness gives high concentration or density of energy at the retina and the pupils are forced to contract abnormally and constantly to protect the eyes. "The illumination of any surface requiring the continued application of the eye should be such that the light reflected or transmitted by it shall be equivalent to a luminosity of approximately one lumen to two lumens per square foot."—Charles Sheard, *The National Health*, 6:316 (May), 1924. A. W. B.

✤

**A Resume of the Antimalarial Operations at Cristobal, Colon.**—Cristobal, with population of 37,500, is located on Manzanillo Island near Atlantic entrance to Panama Canal. In 1917, anti-malaria work had extended about

one-half mile from inhabited sections, all vegetation was kept closely trimmed; swampy areas were filled or drained and all drains were oiled every seven days. With the malaria rate continuing high, an investigation showed Anopheles to be breeding in countless numbers in extensive swamps surrounding city, necessitating the building of extensive drainage systems. Further investigation proved that swarms of mosquitoes were coming from swamps one and three-quarter miles across the bay from the city. These swamps were drained by digging sea-level ditches permitting the free circulation of sea water. This proved an efficient and economical method of controlling mosquito breeding.—Dr. J. L. Byrd, *The Nation's Health*, 6:319 (May), 1924. A. W. B.

✤

**Every Community of 5,000 or More Can Afford a Swimming Pool.**—Believing that a swimming pool for its citizens is a better investment than a pond for ducks, Lynchburg, Va., enlarged and deepened its two connecting duck ponds in Miller Park and provided a swimming pool of 250,000 gallons capacity. These changes and a 4-room, 60 x 20-foot bath-house with facilities to accommodate a daily attendance of 500 were completed at a cost of $2,225.36. A fee of 5 cents for children and 10 cents for adults makes the pool self-sustaining.—C. R. Wood, *Am. City*, 30:647 (June), 1924. A. W. B.

✤

**Asphalt Bottom for Swimming Pool in Manhattan, Kansas.**—Swimming pool constructed in public park has asphalt bottom which has proven to be an ideal treading surface.—H. W. Alexander, *Am. City*, 30:667 (June), 1924. A. W. B.

✤

**Ellsworth—2,100 Population—Builds a Municipal Swimming Pool.**—Citizens of town presented petition requesting a special election to vote on proposition. Election was held and proposition carried, the town building a reinforced concrete pool 50 x 100 feet with 180,000 gallons capacity. A charge, including towel, of 25 cents for adults and 10 cents for children is made. Suits can be rented at 10 cents for cotton or 25 cents for wool. Pool is drained, cleaned and refilled weekly, and water is constantly running in while pool is in operation.—Elden R. Shaw, *Am. City*, 30:668 (June), 1924. A. W. B.

**Philadelphia Advised to Spend $99,000,000 for Water.**—Recommendations designed to provide Philadelphia with a water supply of 500 m.g.d. in 1975, include early abandonment of Schuylkill River, enlargement of Torresdale filtration plant which draws water from Delaware River, and adoption of meters. Interconnected storage reservoirs on Perkioman and Tohickon Creeks would have a combined capacity of at least 85,000,000,000 gallons.—*Eng. News-Rec.*, 92:908 (June 5), 1924. A. W. B.

✤

**Chlorinated Overflow Storm Sewage to Go into Water Reservoir.**—To divert all sewage and storm water from the existing combined sewers out of drainage area tributary to the future water reservoir would be prohibitively expensive and final recommendation of Springfield, Ill., Sanitary District favors diverting and pumping to main sewage works the dry-weather sewage flow. The storm flow up to 25 times the dry-weather flow would be freed of settleable solids and disinfected and discharged into the reservoir.—*Eng. News-Rec.*, 92:973 (June 5), 1924. A. W. B.

✤

**Chlorination Purification Put to New Use.**—Vegetable matter from river waters forms a gelatinous deposit on the upper and inner surfaces of condenser tubes, acting as an insulator to the passage of heat from the condensing steam. The addition of an exceedingly minute dose of chlorine to the circulating water inhibits the formation of the jelly-like deposit.—H. W. Coulson, *The Nation's Health*, 6:342 (May), 1924. A. W. B.

✤

**School Baths Development in Baltimore.**—Ten showers placed in operation in 1916 in a public school where the neighborhood consisted of people largely of foreign birth proved a wonderful factor for good to the children who go back to their rooms refreshed and alert for work. In 1922, a standard set of shower plans was evolved for use in the new schools. These plans call for ten showers each on the boys' and girls' side, with an additional open shower room on the boys' side to permit of mass bathing. The first of the new schools completed permits bathing, at least once a week for every pupil over kindergarten age.—*The Nation's Health*, 6:344 (May), 1924. A. W. B.

# INDUSTRIAL HYGIENE AND OCCUPATIONAL DISEASES

DRS. E. R. HAYHURST and N. C. DYSART

**What About Ozone in Ventilation Work?**—Is it true that the use of ozone in the ventilation of schools will allow of recirculation of from 40 to 60 per cent of the air, as its proponents state, saving perhaps 50 per cent of the coal bill? Is ozone, used in proper concentration, beneficial to health, or is it not? If it is beneficial in the proper concentration what is this concentration? Are there any bad effects from its use over long periods of time? How is it affected by heat, by moisture in the air, by the duct work through which it is distributed, etc.? These and many other questions are repeatedly asked and no one seems to have the answer. The authors endeavored to investigate these questions by experimental methods and they succeeded in covering certain of them. First it was necessary to find a reliable test method for estimating ozone in the air. The starch iodid method was chosen and a portable apparatus constructed having a high degree of accuracy. Next a test chamber was constructed. The equipment enabled the investigators to maintain an ozone concentration from 1/100 part per million up to 1,000 parts per million, to recirculate air through the test cabinet or to take air from the outside, also to maintain a temperature up to 100° and relative humidity of 90 per cent. The investigators found that concentrations of ozone much less than one part in one million can be noted by the sense of smell.

The report of experiments, with protocols, drafts, and tables, constitute the bulk of the paper, including several photographs. With concentrations of ozone ranging from 2.1 parts to 8.3 parts per million no bactericidal effects could be detected and only slight effects with concentrations ranging from 300 to 450 parts per million. As is well known, concentrations as low as 0.5 to 1 part per million now have wide application in cold storage plants in the prevention of the growth of molds. Another experiment indicated that ozone mixed with air even when exposed to light is a much more stable substance than is generally believed. From the experiments it is evident that in occupied buildings the ozone concentration practically never exceeds 0.1 of 1 part per million. According to Jones and Yant the quantities of oxide of nitrogen also produced by the ozone machine generator would be much less than this so that physiological effects from nitrogen oxides would seem to be negligible. A very small amount of water in the liquid state will absorb the ozone present. Advantage may be taken of this by which an ozone machine and an air washer may be combined so as to ozonize the aid before entering the washer. After the water becomes saturated with ozone the excess passes into the system, the water being sterilized by the ozone in the meantime. Also, ozone production decreases materially with an increase in the moisture content of the air—a fact of practical importance to manufacturers of equipment.

No direct experiments were made to determine the physiological action of ozone. Its continuous use for one year in the Resin' Orr school without any visible or demonstrable ill-effects on the pupils and with a continued favor of 95 per cent of the teachers, argues in its favor. Some individuals have unusual idiosyncrasy to ozone. One of the investigators was so susceptible that the odor of ozone could be detected on his exposed skin surfaces several hours after he had left the cabinet and even after he had washed with soap and water.

The general conclusion is that the action of ozone must be considered as identical or at least very similar to the action of nascent oxygen. Comparing concentrations with other commonly used gaseous disinfectants or germicides, the authors found ozone much more active than any of them. As compared with sulphur dioxide it is 160 times more bactericidal; 37 times more so than formaldehyde, and 1.7 times more so than hydrocyanic acid.

"The fact that ozone is a deodorant and a powerful germicide, and the further fact that it can be generated conveniently at a very low cost makes it a substance that should receive the careful consideration and study of the engineering profession in connection with ventilation and air conditioning work."—E. Vernon Hill and John J. Aeberly, Chicago Dept. of Health, *Heating and Ventilating Magazine*, November, 1921–March, 1922.

Ozonization of Air.—Ozone may exist in traces in the atmosphere. Ozone, which is oxygen in an allotropic and highly active condition, is absent from town air; and it is doubtful whether it anywhere exists as a constituent of the atmosphere of any real importance. This composition is, as regards the four gases which compose almost the entire bulk of ordinary air, remarkably uniform in every part of the world. Even in the midst of large cities, where the atmosphere is being polluted in many ways, the air of open spaces differs but very slightly in the proportion of its constituent gases from the air on the open plains, mountains, or seas, which is far removed from such sources of contamination. *Ozonization of air* "has been recommended for the deodorization of foul atmospheres and for the destruction of the organic matters and living microbes that may be present in such air. The amount of ozone in the air, which is produced by the use of the apparatus of the Ozonair Company, is ordinarily from 1 to 5 parts per million, the limit for comfortable respiration being about 10 parts per million; above this amount the irritating effect on the mucous membranes of nose, eye and throat begins to get very marked. In the Ozonair Company's apparatus, ozone is produced by the action of an alternating electric current of high frequency on the oxygen of the air, through the medium of a nonsparking or silent (condenser) discharge, no oxide compounds of nitrogen being formed by this form of discharge. The machine, when at work, emits a continuous stream of ozonized air, which for ventilating purposes is mixed with ordinary atmospheric air, the resulting mixture having the composition above mentioned (1 to 5 parts per million of ozone). The characteristic smell of electrically produced ozone is noticeable in air containing these small amounts of the gas, but it is not disagreeable, nor are there any irritating effects on the mucous membranes of the eye, nose, or throat, probably because of the absence of oxides of nitrogen. Air ozonized to the extent that is compatible with comfort is a safe and valuable deodorant. Whether volatile organic matters in the air are actually oxidized and destroyed by these very weak dilutions of ozone, or are merely masked and rendered inappreciable by the penetrating odor of the gas, is a matter of uncertainty. What, however, is certain is that, in the very weak dilutions that can be inhaled with safety, ozone has no sterilizing or disinfectant action on air-borne microörganisms. To destroy the *Bacillus typhosus* in dry air there must be present 0.3 per cent of ozone in the air (3,000 volumes per million), and the bacilli must be allowed to remain in contact with the ozonized air for one hour, otherwise disinfection is incomplete. The bacilli of tubercle, influenza, diphtheria, and nasal catarrh are probably not less, but more, resistant than the *B. typhosus*, so that it is evident that an atmosphere containing 10 parts per 1,000,000 of ozone—the limit for respirability—has only 1/300th part of the amount of ozone requisite to destroy pathogenic organisms, which must be left in contact with it for an hour at least."—Parkes and Kenwood, "*Hygiene and Public Health*" (Blakiston's Son & Co.), 7th edition, 1923, pp. 155, 215.

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**Child Actors in Pennsylvania.**—The Child Labor Act of Pennsylvania includes children employed on the stage according to a recent decision of Judge Joseph P. McCullen of the Court of Quarter Sessions, Philadelphia. Hearings had been held by the Industrial Board of Philadelphia and Pittsburgh which were attended by social workers who argued that child actors had been exploited, and by members of the theatrical profession who told of the benefits derived from such work by the child. The decision includes all children under fourteen years of age who are employed for pay on the stage. The Department of Labor and Industry has taken such vigorous action as to eliminate all child actors from the state.—*Labor and Industry*, 1, No. 5; 5 (May), 1924.

✤

**Commercial Solution Claimed to Reduce the Hazard of Carbon Monoxide Poisoning in Garages.**—The U. S. Bureau of Mines has recently investigated the efficacy of a compound claimed by its manufacturers to act beneficially on garage workers under the inference that it reduces the CO hazard. The manufacturers recommend that the compound, after dilution, be sprayed on the floor, under work-benches, into pits, elevator pits, around testing blocks, on the service floor, and on steam pipes or radiators. The manufacturers' circular claims that "Many mechanics dip a piece of clean waste into the 'compound' and keep it in their pockets to breathe on when they feel any headache coming on—it relieves

one of headache almost instantly. Spray once a day or oftener—the more it is sprayed the better the health of your men."

After careful tests the investigators reached the conclusion that the "compound" does not absorb carbon monoxide from garage atmosphere, consequently the spraying of this solution around garages does not decrease the hazard or danger of poisoning from the inhalation of exhaust gases from automobiles.—A. C. Fieldner and W. P. Yant, Reports of Investigations, *U. S. Bur. of Mines*, Serial No. 2,594 (April), 1924.

✤

**Domestic and Industrial Carbon Monoxide Poisoning.**—A table is given showing the approximate percentages of carbon monoxide in gases from various sources of poisoning. Incomplete records of the Ohio State Department of Health for the winter of 1922–23 showed 64 deaths and 113 partial asphyxiations from domestic sources. Fifty-five of the deaths were due to gas heaters and stoves and five to automobile exhaust gas. Importance of room ventilation and the venting of gas stoves by flue is stressed. Examples are given of poisoning by carbon monoxide from several sources. Carbon monoxide, itself odorless, is not always accompanied by odors of other combustion gases so that odors coming from domestic gas stoves may or may not be a criterion for judging the presence of CO. The effect of the gas on birds and mice is more or less satisfactory as an indicator of its presence but the flame of the miner's lamp should not be depended upon as it is not affected even in the presence of 1.5 per cent, an amount quickly fatal to man. The U. S. Bureau of Mines has recently devised methods for the detection, both qualitative and quantitative, of the gas in both blood and air. Animals without red blood (hemoglobin) are apparently not affected by the gas, and roaches have been kept several days in an atmosphere of over 60 per cent carbon monoxide and 20 per cent oxygen without lessening their activities. The personal equation and the rapidity of the poisoning cause a great variation in the nature and number of symptoms and the severity of after-effects. An excellent dissertation on the prevention, diagnosis and treatment of carbon monoxide poisoning is included.—R. R. Sayers, Reports on Investigations, *U. S. Bur. of Mines*, Serial No. 2,593 (April), 1924.

**Hours of Work of Children.**—An interesting history of the attempt to regulate the hours of work of children may be found in a manual (*Research Report No. 68*) of the National Industrial Conference Board. The constitutionality of the regulation of hours of work of children has been affirmed on the ground that children are legally incapable of making contracts in their own behalf but, being wards of the state, the latter can set any necessary condition for their employment in the interest of the public welfare. In order to eliminate any qualities existing between the laws of separate states it was proposed, in 1916, that a federal law be passed providing a single set of minimum requirements for the labor of children throughout the country. The federal regulation of the hours of labor of employees of private corporations engaged in interstate commerce has been upheld by the courts. The right of the federal government to impose a confiscatory tax on the product of an industry it wished to destroy because of its harmful effects on those engaged in it had precedent in the tax on matches made from white phosphorus, the constitutionality of which has not been questioned.

"Having failed twice to secure the regulation of the hours of work of children on a national basis through federal legislation, advocates of federal control of the conditions under which children might be employed began the movement for a constitutional amendment which would make this regulation possible by direct legislation. Numerous proposals embodying this idea were made to the Sixty-seventh Congress, and the reports of the Committees on the Judiciary of both the Senate and the House were favorable to an amendment. The proposal which they recommended for affirmative action by the Congress, and submission to the states for ratification is as follows: 'The Congress shall have power, concurrent with that of the several states, to limit or prohibit the labor of persons under the age of eighteen years.'

"The adoption of this amendment by Congress and the requisite number of states would permit the federal government to do much more than merely regulate the number of hours of labor which children might be employed, but such restrictions would undoubtedly be among the first to be imposed under federal authority. No action was taken by the Sixty-seventh Congress."

In this report very little stress is laid on the health aspect of shortening work hours. In this connection the following statement is made: "Arguments for shortening the work day in the United States at first were based on the grounds that children should have more opportunity for education and that adult workers should have more leisure in order that they might exercise more intelligently their rights as citizens. It was not until later, when the factory system was more firmly established, that the strain of machine production and repetitive operations gradually came to be recognized. *In recent years the health dangers of excessive hours have furnished perhaps the most important excuse for shortening the work day.*" (Italics are the abstractors'.)

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**Industrial Health Discussed at Annual Safety Congress.**—In this article a summary is given of addresses by physicians and surgeons interested in industrial health work in various section meetings of the Twelfth Annual Congress held at Buffalo in October, 1923. The need for a periodic physical stock-taking was brought out by many notable speakers. Dr. Robert Carothers states that only 2½ per cent of 1,000 wage earners of both sexes, recently examined by a committee of the New York Academy of Medicine, were perfectly normal and healthy. Twenty-five per cent of these needed hygienic or social advice and 72 per cent needed either medical or surgical treatment. Dr. C. E. Ford said a surprisingly large number of people who considered themselves in excellent health, were found on physical examination to suffer from many defects which are potential causes of sickness. It has been observed that employees who have held their positions for 20 to 30 years are always in better health than floaters. The three major factors which have combined to increase the average longevity are preventive medicine or public health service, modern surgery, and the safety movement. He said that out of each 100 persons in the United States, 3 are constantly ill, and that more than 3,000,000 persons are incapacitated from sickness practically every day in the year. Twenty per cent of the population may expect at least seven days of sickness every year. Mr. Seth L. Bush, in discussing his experience as research manager in a pulp and paper mill, said that physical examinations of applicants for employment were initiated after it was shown that a number of claims for compensation had been made for infections and conditions acquired previous to employment. Dr. R. S. Quinby believed that defects and their percentage of occurrence runs about as follows: Gross eye defects, from 5 to 7 per cent; hernia, among men, from 5 to 7 per cent; gross circulatory defects, about 2 per cent, and lung conditions about the same percentage. The relation of industrial medical service to general practice was discussed by Dr. Harry Meyers. "The general practitioner should be willing to coöperate with the industrial physician when it comes to the point of advising his patient to give up his job. Advising a man to change his work is usually a serious matter, since it often involves impossible readjustments, and, as it is considered that such a suggestion is often made thoughtlessly, no doctor has a right to give such advice unless he is willing to go to the plant and personally see just what his patient is doing and under just what conditions he is doing it."—*Monthly Labor Review*, 18, No. 5: 184 (May), 1924.

✚

**Sickness Among 21,000 Automobile Workers.**—The sickness statistics of the benefit associations of Flint and Pontiac, Michigan, automobile workers are compiled with certain deductions, in spite of the limitations found, such as excluding disability for periods of less than six working days and after thirteen weeks; also excluding the influence of intoxicating liquors, immorality, wilful misconduct, vice, violation of law, fighting or scuffling, venereal diseases, neuritis, lumbago, trachoma, lame back, straining of the lumbar muscles and hernia. Rheumatism is usually excluded, also disabilities existing prior to membership and those not common to both sexes. Benefits also are paid only to those in good standing for twenty-one days before sickness began. The summaries show seasonal tendencies in the incidence of certain specific diseases. Except for lead poisoning, the sickness rates by plants do not indicate the seriousness of industrial diseases, although the relative high frequency of certain diseases, such as diarrhea and diseases of the stomach in one plant in Pontiac, and of the nervous system in another plant in Pontiac, and of the digestive system in a plant in Flint, suggest more investigation into the causes thereof.—D. K. Brundage, *U. S. Pub. Health Reports*, 39, No. 16 (April 18), 1924.

# FOOD AND DRUGS

C. L. ALSBERG, M.D., AND D. B. DILL

**Report on Coffee Investigations—Massachusetts Institute of Technology.**—It is concluded that coffee has a stimulating and fatigue-relieving effect due to the action of caffein which acts on the central nervous system. They find that coffee increases the power to do muscular work and increases the power of concentration of mental effort and is therefore an aid to sustained brain work. Unless consumed in excessive quantity, coffee is not followed by undesirable after-effects. The activity of the organism is speeded up for a time and then returns to the normal level at which it was working before stimulation, but does not go below that level. They assert that caffein is not habit-forming in the sense that constantly increasing quantities are required in order to secure stimulation. The average cup of strong coffee contains 1.5 to 1.75 grains of caffein. Considerable attention is paid to the method of preparing coffee. Hard or alkaline waters exert an unfavorable influence on the character of beverage coffee. Infusion of coffee at 185–203° F. for two minutes represents optimum conditions. The action of coffee infusion on metals is pronounced. Tin-plate aluminum, copper, nickel, and silver all affect the taste of coffee, in general in the order named. Glass, porcelain and vitrified wares exert no influence on the taste of coffee. Coffee in the bean retains its flavor longer than in ground form. Freshly roasted and ground coffee are necessary for the best flavor.—From summary in *Am. Food J.*, 19, 11–12 (1924).

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**Cystine and Vitamin Content of Lentils.**—The proteins of the lentil, Lens esculenta, like those of the beans of the genus Phaseolus, are limited in their nutritive value by a deficiency of the sulphur-containing amino acid, cystine. Albino rats fed on a diet containing 66 per cent of raw lentil declined in weight promptly and lived, on an average, only 33 days. Somewhat better results were obtained when the lentil had been cooked. On the same diet to which 0.36 per cent of cystine had been added, the animals made from fair to very good growths. Two grams daily of lentil furnish about the minimum quantity of vitamin required for the normal growth of the albino rat, while the quantity needed to furnish the required vitamin A is not far from 25 grams.—D. Breese Jones and Joseph C. Murphy, *J. Biol. Chem.*, 59, 243 (1924).

✤

**Preserving the High Vitamin Potency of Cod Liver Oils.**—The old process of obtaining cod liver oil consisted in allowing the liver to decompose until the tissues weakened sufficiently to release the oil from the liver cells. The resulting product was of nauseating odor and after having been subjected to refining processes had no doubt lost a part of its vitamin content. Under present conditions care is taken to select only firm livers and to employ modern sanitary rendering equipment. An attempt is now being made by manufacturers of cod liver oil to supply the physician with definite information concerning the vitamin potency of the oil which the physician wishes to use in vitamin therapy.—Arthur D. Holmes, *Am. Food J.*, 19, 55 (1924).

✤

**The Protein Requirement of Milk Production.**—Metabolism experiments on cows showed that an intake of protein 1.25 times as great as that eliminated in the milk in a previous period was sufficient to establish nitrogen equilibrium. In good milkers the reduction of protein intake decreased the milk production while a subsequent increase resulted in an increased milk output; with poor milkers such effects were not noted.—J. A. Fries, W. W. Braman and Max Kriss, *J. Dairy Sci.*, 7, 11–23 (1924); *Chem. Absts.*, 18, 1319 (1924).

✤

**Dietary Requirements for Reproduction.**—The literature bearing on the existence of a vitamin essential to reproduction is reviewed. Experiments are reported which have been under way for four and a half years and are confirmatory of the finding of Evans that such a vitamin is found in green lettuce. This reproductive vitamin also has been found in Georgia velvet beanpod meal, polished rice, yellow corn, and rolled oats. With beanpod meal autoclaved at 15 to 18 pounds pressure for 1½ hours, fertility and a significant success in rearing young rats were possible. This new dietary complex is thus relatively thermostable. Evans has proposed that this factor be designated vitamin X. The finding of

McCollum et al is that there exists a factor in cod liver oil, independent of fat soluble A, which plays an important rôle in bone growth. The substance reported by Funk and Dubin to be essential to the growth of yeast and streptococcus is not considered verified. Accordingly the following nomenclature is proposed:

Fat-soluble A—the antixerophthalmic vitamin.

Water-soluble B—the anti-beriberi and growth-promoting vitamin.

Water-soluble C—the antiscorbutic vitamin.

Vitamin D—the antirachitic factor.

Vitamin E—the reproductive factor.

—Barnett Sure, *J. Biol. Chem.*, 58, 681–709 (1924).

✤

**Experimental Milling and Baking (Including Chemical Determinations).**—This bulletin contains descriptions of (1) the method of handling and analyzing the samples received for milling and baking tests, (2) the experimental mill and its operation, (3) the baking laboratory and the method used in baking, and (4) the equipment and methods of analysis used in determining the chemical constituents of grain and mill products. The significant factors determining flour quality which are evaluated by baking experiments are loaf volume, loaf weight, color of crumb, and texture of crumb. "There is no unanimity of opinion in answer to the question as to what chemical constituents are of principal importance in regulating the baking strength of flour. Current among the factors associated with quality of flour are: the proteins of the flour, the nature and quantity present; the influence of acids, bases, and salts upon the physical properties of the proteins; the acidity of the flour; the nature and amount of the mineral salts already present, and the kind of food supplied the yeast plant during the fermentation of the dough, as well as the nature of the fermentation products developed by diastatic or proteolytic enzymes." The principal proteins of flour are glutenin and gliadin. These constitute the major portion of the gluten and also play a major rôle in loaf formation. A list of available bulletins of the U. S. Department of Agriculture pertaining to grain standardization is appended.—*U. S. Agri. Dept. Bull.* 1187, April, 1924.

**The Iron Content of Spinach.**—Thirteen varieties including New Zealand spinach were examined. The iron content of the market varieties ranged from 0.00867 per cent to 0.00556 per cent. The average of content of truck spinach was 0.00512 per cent, of dehydrated 0.056832 per cent, and of canned .000760 per cent.—Aaron Lichtin, *Am. Jour. Pharm.*, 96, 361–364 (1924).

✤

**Microscopic Detection of Some Fortified Milks.**—Milks are to-day being fortified by the addition of condensed milk products in quantities so small that such addition cannot be detected by Evenson's test (*Journ. of Dairy Science*, January, 1922). The author is able to detect them by centrifuging the milk, making smears of the sediment, staining with methylene blue, and examining under the microscope. Bodies suggestive of minute starch grains and readily distinguishable from minute fat globules by their irregular forms and the method of staining are observed in the fortified milk and are absent from natural milk.—David Wilbur Horn, *Am. Jour. Pharm.*, 96, 365–6 (1924).

✤

**Histology and Chemistry of the Avocado.**—This paper contains an interesting history of the avocado from the time of its first mention by the Spanish invaders of North America, as well as a description of the tree and fruit and of the histology of the latter with illustrations. Some analyses are given and it is calculated that one pound of the edible portion represents an average of 1,000 calories, its high fuel value being due to the presence of a large amount of fat, 20 per cent on the average.—W. J. Stoneback and Ralph Calvert, *Am. Jour. Pharm.*, 95, 598–612 (1923).

✤

**Some Constituents of Ragweed Pollen.**—This is the last of a series of papers on the chemistry of ragweed pollen, the preceding communications having been published in the *Journal of the American Chemical Society*. Twenty-seven well-defined substances have been identified, but with the exception of the coloring substances and possibly the proteose obtained from the water soluble fraction, none of these substances appear to represent any chemical specialization in this cell.—*Jour. Am. Pharmaceutical Association*, XII, 669–676 (1923).

# CHILD HYGIENE

TALIAFERRO CLARK, M.D.

**The Health of Kindergarten Children.**—A survey of 1,000 kindergarten children approximating one-sixth of the total kindergarten enrollment in the Minneapolis, Minnesota, schools was undertaken as an outgrowth of the nutritional class work of the Woman's Community Council of Minneapolis in the public schools. The purpose of this survey was to gather statistics on the kindergarten child in Minneapolis.

Of these children 572 were breast fed from seven to fifteen months of age and only 172 children were reported as breast fed for a period not in excess of six months, and 46 were exclusively bottle fed. According to the reports by mothers, 262 children were given inadequate quantities of water to drink, 201 had inadequate quantities of milk, and 256 children used tea or coffee. With regard to the use of "sweets" 100 mothers reported that their children were not given candy and sweets, and 337 mothers reported the unrestricted or unregulated consumption of candy and sweets.

Eight mothers reported inability to make their children eat breakfast and 484 children had inadequate breakfast. A total of 368 children were reported rarely to eat luncheon at home or as prepared and 238 ate "what they pleased when they pleased."

It is revealed that 165 children did not have adequate hours of sleep, and the custom of morning or afternoon naps for the children was entirely unknown in 840 families. Over one-half of 644 mothers claimed that their children were not allowed to attend the movies and 115 children were reported as attending moving picture shows weekly. Seventy children engaged in other activities outside of school hours as dancing, music, and dramatics. Children of 103 parents were reported as incorrigible. In 603 families control was through interest, through punishment in 284, and corporal in 193.

Diseases and deformities were noted as follows:

| | |
|---|---|
| Eyes | 81 |
| Ears | 27 |
| Nose | 30 |
| Throat, other than tonsils | 37 |
| Tonsils | 132 |
| Where tonsils had been removed | 73 |
| Adenitis | 46 |
| Palpable thyroids | 70 |
| Heart | 20 |
| Lungs | 9 |
| Abdomen | 3 |
| Teeth | 415 |

—F. E. Harrington, *Educational Bulletin No. 4, Minneapolis Public Schools* (May 1), 1924.

✤

**Children of Tuberculous Mothers.**—It seems well established that tuberculous infection of the fetus, produced through the placenta, is of infinitely rare occurrence and that the infection of nurslings born of tuberculous mothers is the result of familial contagion. In France, Landouzy and Barbier have maintained that these children are born with a diminished coefficient of vitality. In contravention of this view Debré believed it possible to show that the weight of these children at birth is but little, if any, below the average. Recently, Professor Couvelaire, as a result of his studies of children born of tuberculous mothers, and brought up by foster parents out of contact with these mothers, exhibited a very high mortality—38 per cent in the first month. "Most of the infants died from no demonstrable cause—one might say they went out like lamps unsupplied with oil."

At one of the last sittings of the Society of Biology, Vignes stated that, with few exceptions, if one compares the weight of the children born of tuberculous mothers at the exact term of gestation with the average weight observed at the same period of the newly-born in Paris, instances of weights superior to the average or approaching that average will be observed, and a very great number of children who are inferior in weight. The inferiority in weight will be found to be more accentuated in children of multiparæ than among those of primiparæ.—Paris Correspondent, *The Lancet* (May 10), 1924.

✤

**Instructions for School Physicians.**—New instructions, which define their duties, have been recently issued to the school physicians in Berlin. They are required (1) to make physical examination of pupils; (2) to hold

consultation hours; (3) to make sanitary inspection of schools; (4) combat transmissible diseases; and (5) perform certain special duties.

Physical examinations will be made on admission to the third and fifth grades and immediately before completion of course. In the higher schools they will be made on admission to the freshman class and at intervals of three years until dismissal. Special examinations at regular intervals will be made of children requiring regular surveillance.

Examinations will be made in the presence of the parents and completed within four weeks after admission. A child of school age unable to attend school may be examined before admission.

The special duties are to conduct all other examinations necessary to the health of the schools such as the examination of foodstuffs, the inspection of transportation, and participation in the special course of instruction (correction of stutterers, orthopedic gymnastics, swimming).—*J. A. M. A.* (April 5), 1924, p. 1136.

✤

**Breast Milk in Relation to Rickets.**—Based chiefly on a chemical study of the blood Howland advanced the conception of the existence of two forms of rickets, (1) the low calcium and (2) the low phosphorus types. Experimentally the feeding of the low phosphorus diets to animals leads to the production of true rickets, whereas the low calcium diets lead rather to osteoporosis. However, in all forms of rickets the body as a whole shows a lowering of its calcium content.

Recently, it has been shown that there was no reduction in the inorganic phosphate constituents in the breast milk on which the baby develops rickets, and, because of this, the present study of the calcium content of breast milk in its relation to rickets was undertaken at the Touro Infirmary. The breast milk was obtained from mothers attending the new-born service.

It is shown by this study that milk from some of the severest cases of rickets showed calcium content well within the range for "normal" milk, two of them being higher than the normal average. On the other hand there is found nowhere in the controls the low extremes observed in the rachitic group.

Milk was secured from only 19 control cases, and in order to obviate a possible error in comparing the average from a larger number of test milks the first 19 milks of the rachitic group were averaged and found to be 26.7 mg. calcium per 100 cubic centimeters, an average lower than that of the entire 51 test milks which was 27.5. Owing to the marked tendency of colored babies to develop rickets the possibility of some reduction in milk calcium in colored mothers was inquired into. A recent study by Burhaus and Smith showed the average of milk for white mothers as 30.79 mg. and for the milks of colored mothers 25.41 mg. of calcium per hundred cubic centimeters. The average in this study is 31.1 mg. for the white race and 27.3 mg. for the colored mothers.—The Calcium Content of Breast Milk in Relation to Rickets, L. R. DeBuys and L. Von Meysenburg, *Amer. Jour. Diseases of Children* (May), 1924.

✤

**Health Supervision and Infantile Mortality.**—In the city of Kingston-upon-Hull, England, in the year 1913 there were 7,834 births with an infantile mortality rate for the city of 130. In 1923, although the deaths from diarrhea numbered as many as 123, an uncorrected rate of 17.8 per 1,000 births, the infant mortality rate dropped from 106 in 1922 to 83. The total attendance at Infant Welfare Centers was practically the same as in 1922—over 28,000. In seeking a reason for the big drop in the infantile mortality rate there is found an interesting coincidence in the fact that the revisits made by the "health visitors" to infants under one year of age had nearly trebled in 1923. In 1921 the average number of visits per working week of five days was 57 visits per health visitor. The total number of visits numbered 28,450 for the year of 50 weeks.

In 1923 the increase was such that a total of 55,500 visits or 92 visits per week per health visitor were paid while the revisits to infants under one year of age had been practically trebled.

In order that the enthusiasm of visiting nurses may be obtained and the monotony of routine work may be broken, it is a help and a stimulus for them to have their enthusiasm kept alive by up-to-date lectures, by the provision of good literature bearing on their problems, and by occasional research or special investigations into which they can enter. A knowledge of the vital statistics of their district with special reference, for instance, to their own particular city ward is an aid to broadminded and intelligent work.—Maternity

and Child Welfare Work in a Big County Borough, Katherine Gamgee, *The Medical Officer* (April 5), 1924.

✤

**Health and Character.**—As a result of a study of about 2,000 boys and 2,000 girls in English schools by Karl Pearson, it appears that health is not necessary for good nature in children. Neither is health nor the lack of it always or even frequently associated with vivacity, popularity or conscientiousness.

There was found to be little relation between health and general intelligence, though athletic prowess went with good health as did self-assertiveness. The old idea that delicate children take to intellectual work and are shy and conscientious is not confirmed and neither was it found that lively boys are likely to neglect studies for physical sports.

Dr. Pearson's results seem to indicate that it is not possible for teachers to modify general intelligence or psychic character which seem to be unchanged throughout the whole school life; that general health changes little during the school period; that health is not a governing factor of temperament, though found to be associated to only a slight extent with qualities of character, and with temper practically not at all.

As a result of a similar statistical study of 1,600 babies from a large manufacturing town Dr. Pearson concludes that the good health of babies depends more on heredity than from the station of life in which they are born or the care they get. It is stated that the poor health of the artificially fed babies is chiefly due to the inheritance of weakened constitution of the mother not able to nourish the child. The health of the father and mother is most important and is more definitely correlated with the health of the child than the wages of the father or the employment of the mother.—*Science* (May 30), 1924.

✤

**Heart Disease in Childhood.**—As a result of an investigation by the Bristol school medical department of the prevalence of heart disease and the extent of the facilities for the proper treatment of this disease among school children it was concluded that there were two great difficulties to be overcome in the treatment of this disease, (1) ignorance in regard to the disease, and (2) lack of facilities for treatment. As a first step in educational propaganda the following circular was issued for the information of the teaching staff:

1. Heart disease is one of the greatest causes of death and invalidity at the present day. Last year, 59,800 people died of this ailment in England and Wales—that is to say, one death in every eight was due to heart disease.

2. Many cases of heart disease commence in childhood and are frequently unnoticed at their onset. If cases are treated properly in the earlier stages a cure can usually be effected, but once the heart is seriously damaged complete recovery is impossible.

3. The most frequent cause of heart disease in childhood is rheumatism. Rheumatism is due to an organism which is liable to attack the heart and cause heart disease. In addition, this organism is the cause of chorea (or St. Vitus' Dance), which is simply rheumatism of the brain. It may also be the cause of chronic sore throats. This rheumatism is frequently quite mild in character in children, so mild that parents may call it "growing pains."

4. Rheumatic heart disease is often painless and requires a doctor's examination for its detection. Shortness of breath, loss of flesh, and pallor are early signs that this organ is affected.

5. Pains in muscles and joints should receive immediate attention as being possibly the onset of rheumatism, which may be followed by heart disease or chorea.

Rheumatism frequently recurs, especially in spring and autumn.

6. Great nervousness, dreaming at school work, alteration in disposition, and slight twitchings are often evident before chorea begins, and are most important warnings.

7. When injured by rheumatism or chorea, the heart recovers slowly from the poisoning, and one of the greatest dangers to the child's future is for it to resume ordinary life before the heart is cured.

8. Three things are specially necessary to combat the present loss of life and efficiency caused by heart disease:

(1) Education of the public in regard to heart disease in childhood.

(2) Prolonged treatment in the early stage of cases where the heart has become affected. This must be under close medical supervision, and in the case of poorer children can only be obtained in hospitals which are able to keep cases for a lengthened period. Such treatment should extend over some months. The first exercise taken must be carefully watched and graded.

(3) Choice of occupation for a child who

has suffered from heart disease in school is most important. Very many lives are wasted through such children taking up the wrong career.—*Medical Officer* (May 24), 1924.

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**Inflammation of the Middle Ear in Scarlet Fever.**—It was found that in a series of 100 consecutive cases of ear discharge in elementary school children the parents stated that it was the result of measles in 18 per cent of the cases and of scarlet fever in 19 per cent.

It was found in regard to the age-incidence that although the greatest number of cases of scarlet fever were between five and ten years of age, the incidence of ear discharge varied from 15.4 per cent at the ages 0–5, which percentage was twice as high as in the five to ten age group and four times as high as in the remaining groups. The incidence of scarlatinal ear discharge for all ages was 7.6 per cent. The chief indication for surgical relief in cases of infection of middle ear are (1) removal of the initial focus of infection, such as adenoids and diseased tonsils, and (2) paracentesis of the ear drum.

The average duration of the ear discharge in 20 cases in a special ward with efficient means of examination and treatment, but without operation, was 32.4 days. In 50 cases treated by the removal of adenoids and with paracentesis when necessary the average duration was 15.8 days. The authors agree with other observers that scarlet fever does not cause a rapid destruction of the ear drum in the early stages of the disease if properly treated.—Scarlet Fever Otitis, E. H. R. Harriss and F. Brayshaw Gilhespy, *The Lancet* (April 26), 1924.

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# PUBLIC HEALTH LEGISLATION

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## CONGRESS ADJOURNS

The sixty-eighth Congress adjourned on June 7, after having been in continuous session since December 3, 1923. As far as public health was concerned the record was about as bad as on nearly every other phase of public business. The sixty-seventh Congress (April 11, 1921, to March 4, 1923) passed 31 laws pertaining to the public health, out of 350 bills introduced on this subject, but the sixty-eighth passed only 10 laws out of about 50 bills relating to national health. About 14,000 bills and resolutions were introduced in both houses. We do not at this time have information as to the total number of laws passed, but we venture to guess that the percentage of health laws is unreasonably, disproportionately, and disgustingly low. It probably always will be until public health has a definite, ethical, energetic lobby, just as do other interests, such as commerce, labor, agriculture, roads, public works, and other branches, none of which are any more important or essential than national health.

Measures relating to public health which passed included the child labor amendment to the Federal Constitution; the prevention of pollution of coastal waters by vessels; prohibition of the importation of crude opium; authorization for an international narcotic conference; extension of the maternity and infancy act to Hawaii; sale of the Marine Hospital at Detroit; an act for vocational rehabilitation; the codification of laws relating to veterans; restoration of the bonus to physicians in the Public Health Service; and several appropriation acts including a large amount for veterans' hospitals. There was also one very much needed piece of legislation and one which it is to be hoped will be efficiently, effectively, and completely carried out. It provided for the ventilation of the Senate chamber—fumigation might well have been added.

So much for the items which passed, none of which it is obvious, is of paramount importance to the health of the nation, though one or two are of considerable significance. When we consider the bills which did *not* pass we find some of the really important ones. Included in the unfortunate category of those which failed were measures: for reorganizing the United States Public Health Service; granting a commissioned status to the sanitary engineers in the Public Health Service; an investigation of medical diplomas and their prohibition through the mails; a plan for a federal department of health; a sanitary reserve corps; promotion of physical education; promotion of rural hygiene; a bureau of medical

research; and various other bills relating to different aspects of health. A much needed increase in salaries for physicians in the Indian Service was passed, but Congress, with its customary lack of efficiency, failed to make any appropriations for this purpose and also failed to appropriate for the vocational rehabilitation act.

### DEPARTMENT OF EDUCATION AND RELIEF

A bill (S. 3445) for a new department of education and relief was introduced on June 3, by Senator Smoot, but no action was taken on it, which was just as well because from the health standpoint it is as thoroughly unscientific as have been all the proposals along this line. It would bring together educational, health, and veterans' activities in three divisions under one cabinet department. The "health" activities transferred would include the Public Health Service, the Bureau of Pensions, St. Elizabeths Hospital, and Friedman's Hospital. The vital statistics work would remain in the Department of Commerce in a new statistical bureau, Indian health would evidently remain in the Department of the Interior, and no mention at all is made of the Children's Bureau. It is about time that a practical plan for the centralization of federal health work, now widely scattered and uncoördinated, is proposed by a national organization with knowledge enough to understand the matter and energy enough to attempt to get it adopted. The National Health Council is undoubtedly the logical agency to do this.

### CHILD LABOR

The Child Labor Amendment (H. J. Res. 184) was passed by the Senate on the evening of June 2, by a vote of 61 to 23, the House having previously adopted it. Several unsuccessful efforts to amend the resolution were made, including proposals to limit its application to children under sixteen and to exempt work in agriculture and horticulture. The resolution as passed is as follows:

"*Section 1.* The Congress shall have power to limit, regulate, and prohibit the labor of persons under eighteen years of age.

"*Section 2.* The power of the several states is unimpaired by this article except that the operation of state laws shall be suspended to the extent necessary to give effect to legislation enacted by the Congress."

This is identical with Senate Joint Resolution 1 sponsored by Senator Shortridge. The amendment has been submitted to the state legislatures for ratification.

### HOSPITALS FOR VETERANS

The President approved, on June 5, a measure (S. 3181) authorizing expenditure of $6,850,000 for additional hospital and outpatient dispensary facilities for veterans. Location and class of patients to be handled, as tuberculous, neuropsychiatric, or general medical and surgical, would be left to the discretion of the director of the Veterans' Bureau, subject to approval by the President.

### EXTENT OF NARCOTIC ADDICTION

The Federal Narcotic Control Board states as "entirely erroneous" an assertion that "The growth of narcotic addiction in the United States and the world over is the most alarming symptom of the new century," and "Our youth, both sexes, by the thousands are being hooked and brought into this living death." The Board further asserts that these statements, as to the United States, cannot be backed up by facts or figures. The immediate occasion for this announcement on the part of the Federal Board was due to a request from the Committee on Printing of the Senate for an opinion as to the merits of a pamphlet entitled "The Peril of Narcotics" prepared by the International Narcotics Education Association, of which Richmond P. Hobson, of Spanish-American War fame, is president. Senator Capper of Kansas had introduced a resolution providing for the printing of 50,000,000 of these pamphlets, which it is estimated would have cost the government about $175,000. The pamphlet was not authorized to be printed.

### CODIFICATION OF VETERANS' LAWS

In the final passage by Congress of the bill codifying the laws of the United States Veterans' Bureau, no provision was made permanently fixing the status and grade of physicians detailed during the last two years from the Public Health Service to the Veterans' Bureau. As the bill passed the House provision was made fixing the rank, grade and pay of these physicians who were placed exclusively under the direction and control of the Director of the Veterans' Bureau. These provisions were not included in the bill as it became a law, and it is a matter of conjecture as to their future status.

The commissioned personnel detailed from the Public Health Service to the Veterans'

Bureau, form by far the largest part of the physicians of the Public Health Service. It is probable that Director Hines of the Veterans' Bureau will fix the status of these physicians by virtue of a general executive order of the President which has given him general authority in matters of this character.

This same bill which codifies the laws relating to the Veterans' Bureau sets up several new standards for determining disability of soldiers. Among these is the provision extending from three to six years the period in which an ex-service man may be presumed to have contracted tuberculous or mental disease. It also extends the time for filing disability claims and increases compensation to widows and children.

### STATE HEALTH LEGISLATION

During 1924 the legislatures of about a dozen states were in session. Bills relating to health were introduced in all of them. A definite attempt to keep in touch with all state health legislation was not made this year, as was done during the preceding two years by the National Health Council and the United States Public Health Service in coöperation. The Council suggested that, inasmuch as the value of the bi-weekly reports had been demonstrated, the Public Health Service, as the official agency, should take them over, but the Public Health Service pleaded lack of funds as a reason for not doing it. The United States Children's Bureau, however, realizing the utility of legislative information, has carried such reports on children's legislation in its weekly news letter. From this and other sources we are able to summarize some of the laws which were enacted.

*Kentucky.*—Bills were passed appropriating $10,000 for care of crippled children; an appropriation for local playgrounds; and for special instruction for children with defective sight.

*New Jersey.*—New laws include: support of indigents in hospitals outside of municipalities (Chap. 243); re condensed milk (Chap. 234); pollution of Passaic River (Chap. 251); indemnities for tubercular cattle (Chap. 22); adoption of health ordinances (Chap. 136); advertising of health ordinances (Chap. 223); regulation of bottled drinks (Chap. 122); county maternity hospitals (Chap. 16). Bills not passed included: employment of nurses by boards of education; pensioning of health officers; sterilization of feebleminded; tuberculosis education; regional health districts; deferring marriages of the venereally infected; directors of school health; vaccination of dogs; making public names of those having communicable diseases.

*New York.*—New laws include: destruction of unwholesome food (Chap. 57); appointment of county public health nurses (Chap. 67); care of tuberculous poor (Chap. 109); vital statistics reports (Chap. 168); investigation of crippled children (Chap. 187); state eye and ear specialist (Chap. 188); school hygiene districts (Chap. 194); state aid for school health work (Chap. 265); health supervision of state lands (Chap. 325); sanitation of restaurants (Chap. 466).

*Virginia.*—Bills which passed include: appointment of local health boards (S. 106); state school for the blind (S. 128). A premarital physical examination bill did not pass, and a bill to provide psychiatrists for juvenile and domestic relations courts also failed.

### SOME RECENT COURT DECISIONS

*Pasteurization.*—A city in the exercise of its police power may require milk for human consumption to be pasteurized and prescribe reasonable regulations under which it shall be done, according to a recent North Carolina decision, *State* v. *Edwards*, 121 S. E. 444. The same case upheld the requirement that the dealer procure a license, renewable annually, subject to a fine for failure to do so.

Pasteurization has been upheld by courts in three other states, Illinois, New York, and Wisconsin. *Koy* v. *Chicago*, 263 Ill. 122; *People* v. *McGowan*, 195 N. Y. S. 286; *Moll* v. *City of Lockport*, 194 N. Y. S. 250; and *Pfeffer* v. *Wisconsin*, 177 N. W. 850. An article outlining in detail the legal aspects of milk control, by the associate editor, will appear in an early edition of the U. S. Public Health Reports.

*Beer as Medicine.*—The United States Supreme Court has recently decided in *Everard* v. *Day* and *Burke* v. *Blair*, that federal legislation prohibiting the prescribing of beer as medicine, is within the constitutional rights of Congress. The Court says that the Eighteenth Amendment empowered Congress to suppress the traffic in liquor as a beverage, and that after due consideration, Congress decided that beer was a beverage and not a medicine, as spirits and vinous liquors may be, and accordingly passed legislation which was valid.

### STATE LAWS AND PREVENTION OF BLINDNESS

The Summary of State Laws and Rulings Relating to the Prevention of Blindness from Babies' Sore Eyes, issued by the National Committee for the Prevention of Blindness, 130 East 22nd Street, New York, one of the members of the National Health Council, has been revised and issued as of January, 1924. The Committee states that a comparison with the 1922 Summary indicates a most gratifying improvement in the legislative action.

The material shows the following facts:

1. The reporting of babies' sore eyes to the local health officer or to a physician is compulsory in..... 47 states
2. The reporting law is printed on the birth certificate in..... 13 states
3. Local health officers are authorized to secure medical attention for uncared-for cases, or to warn parents of the dangers and advise immediate treatment in..... 37 states
4. Births are reported early enough to be of some assistance in prevention of blindness work in.... 16 states
5. The question as to whether or not precautions were taken against ophthalmia neonatorum is included on the birth certificate in. 28 states
6. Free prophylactic outfits are distributed in ..... 32 states
7. The use of a prophylactic by midwives is compulsory in..... 29 states
   By physicians only in..... 2 states
   By midwives and attendants only in ..... 1 state
   Strongly recommended in an additional ..... 1 state
8. Popular educational leaflets, relating in whole or in part to prevention of infantile blindness, are distributed by State Departments of Health in ..... 39 states

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## CONVENTIONS, CONFERENCES AND MEETINGS

This calendar is published through the coöperation of the National Health Council, 370 Seventh Avenue, New York City. The Council will be glad to answer promptly any written or telegraphic inquiries regarding meeting dates in order to avoid conflicts.

August ——, U. S. Hay Fever Association, Bethlehem, N. H.

August 5-7, International Union Against Tuberculosis, Lausanne, Switzerland.

August 10-23, International Boy Scout Convention, Denmark.

August 15-22, American Prison Association and National Probation Association, Salt Lake City, Utah.

August 19-22, National Association of Colored Graduate Nurses, Buckroe Beach, Va.

August 26-29, National Medical Association, Hampton, Va.

August 31-September 2, Utah State Medical Association, Salt Lake City, Utah.

September 9-13, American Electro-Therapeutic Association, New York, N. Y.

September 15-20, American Academy of Ophthalmology and Oto-Laryngology, Montreal, Canada.

September 18-20, American Association of Obstetricians, Gynecologists and Abdominal Surgeons, Cleveland, Ohio.

September 22-24, Mississippi Valley Conference on Tuberculosis, Sioux Falls, S. D.

September 29-October 3, National Safety Council, Louisville, Ky.

September ——, American Roentgen Ray Society, Boston, Mass.

October 6-9, American National Red Cross, Washington, D. C.

October 6-13, American Hospital Association, Buffalo, N. Y.

October 13-14, Oklahoma Public Health Association, Oklahoma City, Okla.

October 14-16, American Child Health Association, Kansas City, Mo.

October 15-17, American Association of Railway Surgeons, Chicago, Ill.

October 16-24, Playground and Recreation Association of America, Atlantic City, N. J.

**October 20-23, American Public Health Association, Detroit, Mich.**

October 20-24, American College of Surgeons, New York, N. Y.

October ——, National Motion Picture League, New York, N. Y.